



UNIVERSITY OF PITTSBURGH
Institute of Politics
Infrastructure Policy Committee

**infrastructure
status and needs**
in southwestern pennsylvania:
a primer

Fall 2012



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LETTER FROM THE INFRASTRUCTURE POLICY COMMITTEE COCHAIRS

DEAR COLLEAGUES:

In January of 2009, the University of Pittsburgh Institute of Politics produced its first document on the infrastructure status and needs of Southwestern Pennsylvania. This is the first comprehensive update of that primer. Like the four updates before, this version builds upon the work of previous editors and contributors while including the latest information on each sector.

Infrastructure plays a vital role in the economy and our everyday lives, yet funding remains a major challenge in addressing the infrastructure needs of key sectors. Along our waterways, thousands of jobs depend on operational locks and dams for the transportation of goods. When it comes to our public transportation, the Port Authority of Allegheny County is facing a significant budget deficit that will force another round of service cuts and layoffs. In the sewage sector, the Allegheny County Sanitary Authority is leading an effort to deal with the system's complicated wastewater issues, a project expected to be our region's largest and most expensive in recent history.

Additionally, development of the Marcellus Shale continues to impact all sectors. The industry offers new economic development opportunities while complicating and straining existing infrastructure as well as the environment. Major concerns include water treatment and road maintenance from rising truck traffic. Other sectors, such as telecommunications, electricity, and natural gas, also see potential for expansion to cater to the growing industry.

With tightening federal budgets and stimulus money already allocated, state and local governments are working to become more self-reliant and creative in searching for new funding mechanisms. Several states are exploring gas tax increases. Some local governments are borrowing money from states at lower interest rates. In this way, taxpayers pay more for real infrastructure investment and less for interest. Various levels of government are exploring opportunities to form public/private partnerships, which can leverage private investments to fund new infrastructure.

At the same time, we also must begin to modernize our essential infrastructure and public services for the 21st century. More than ever before, we have greater access to tools such as the Internet, data systems, and various other communication and information technologies. Using intelligent transportation

systems (ITS) is just one strategy of applying these technologies for the purpose of improving our transportation systems. ITS systems work smarter, result in fewer accidents, reduce congestion, use less energy, and save money in the long run. Together, these technologies enable real-time wireless communication between users—drivers and transit riders—and various devices including those in vehicles, traffic lights, and message signs.

On the national level, the U.S. Department of Transportation is already researching a number of ITS strategies, including real-time data capture and management, road weather management, and vehicle-to-vehicle communications. At the local level, centers such as Traffic21, a transportation research initiative of Carnegie Mellon University, are leading the way in transportation research and innovation. In August 2011, the Infrastructure Policy Committee and Traffic21 hosted a two-day forum dedicated to the topic of ITS. Transforming Transportation: The Role of Intelligent Transportation Systems featured expert speakers who discussed the current state of ITS in government as well as policy opportunities and challenges.

Just recently, the City of Pittsburgh became one of the latest winners of the IBM Smarter Cities Challenge. IBM will provide \$400,000 of consulting services to support MOVEPGH, the city's comprehensive transportation plan. The Smarter Cities Challenge focuses on using new technology resources to help address the numerous challenges facing cities around the world. The program is part of the larger Smarter Planet initiative, which promotes innovative leadership in the use of new data systems and information technology to make the planet a smarter place.

Green infrastructure and innovative maintenance practices continue to be a high priority in the region, despite the mounting baseline needs of every sector. This reflects growing state and federal priorities pushing for utility efficiency. Many sectors also are cutting costs by pursuing design improvements and asset management across and between sectors.

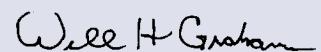
We hope you will find this document to be useful and would greatly appreciate your feedback. You may submit comments to the Institute of Politics at **412-624-1837** or **iopadmin@pitt.edu**. Thank you for your interest in the future of Southwestern Pennsylvania.

Institute of Politics Infrastructure Policy Committee



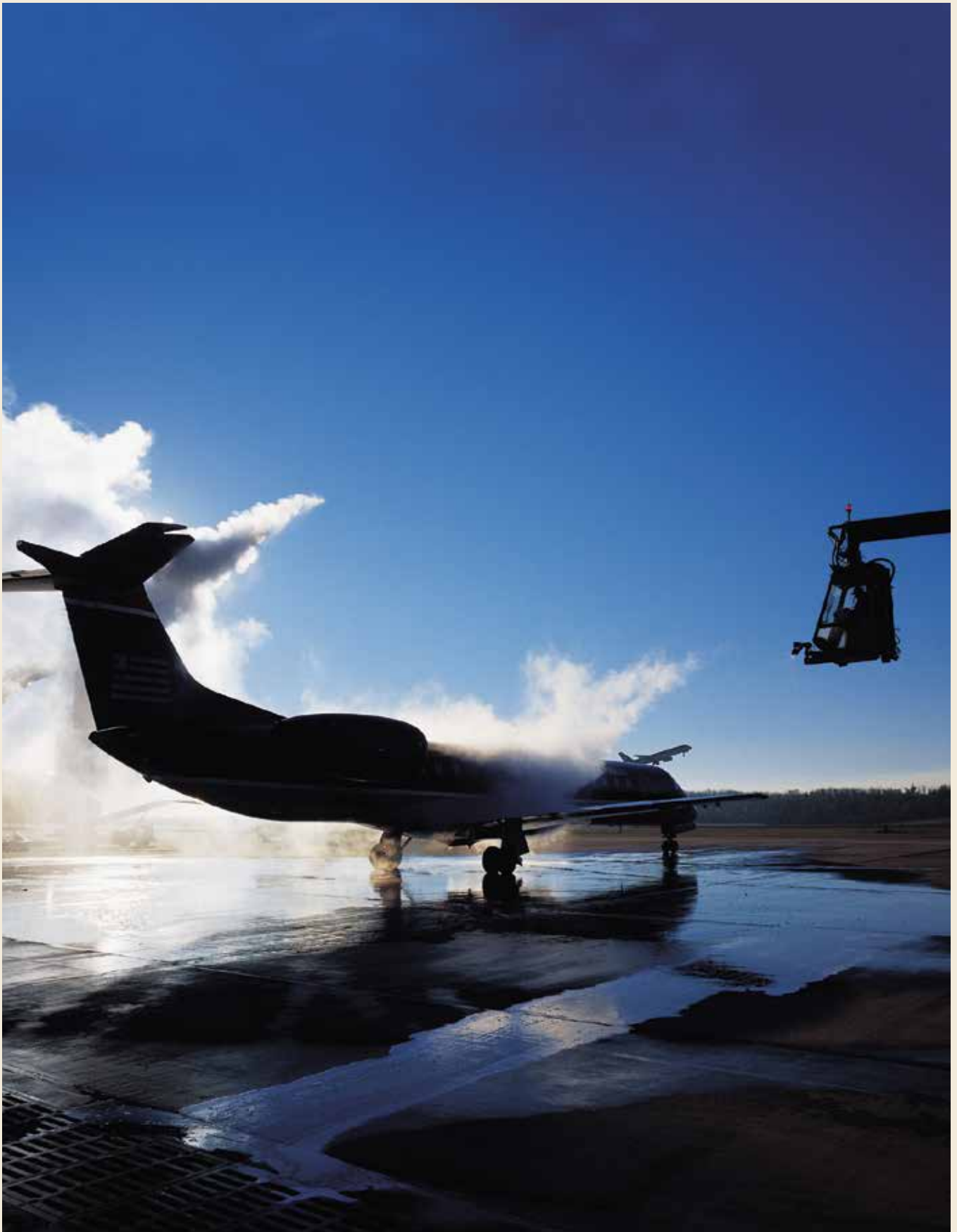
Paul Costa
Cochair

Member, Pennsylvania
House of Representatives



Colonel William H. Graham
Cochair

Pittsburgh District Engineer,
U.S. Army Corps of Engineers



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AIR TRANSPORTATION

Airports make up the most extensive passenger and freight transportation network in the country. Southwestern Pennsylvania is home to two commercial airports, with general aviation airports in every county. A total of 27 public airports and heliports operate in the 10-county Southwestern Pennsylvania region. All of these serve the general aviation community. These include, but are not limited to, private operators, charters, flying schools, tours, corporate aviation, news, and medical services.

KEY PLAYERS

The Allegheny County Airport Authority (ACAA) operates Pittsburgh International Airport and Allegheny County Airport. The Westmoreland County Airport Authority (WCAA) operates the Arnold Palmer Regional Airport and Rostraver Airport.

Two of these airports provide scheduled commercial air service:

- Pittsburgh International Airport (PIT) is located in Findlay and Moon townships, Allegheny County. PIT serves more than 8 million passengers a year.
- Arnold Palmer Regional Airport (LBE) is located in Latrobe, Unity Township, Westmoreland County. LBE serves more than 40,000 passengers a year.

Together PIT and LBE connect Western Pennsylvania, northern West Virginia, eastern Ohio, and western Maryland with direct flights to about 40 destinations in North America and Europe as well as connecting flights to hundreds of additional destinations. All of the economic activity at PIT alone supports more than 70,000 jobs and more than \$5 billion in total economic activity. Airlines continue to see growing passenger traffic through PIT.

Arnold Palmer Regional Airport experienced reduced traffic in recent years after it lost major carrier service to large hub airports. When US Airways cut back on service, LBE commuter service to Pittsburgh was among the casualties. However, the regional airport continued to maintain its fixed-base operators, L.J. Aviation and Vee Neal Aviation. These companies kept demand strong even during periods of zero commercial passenger flights. In 2011, the ultralow-cost airline Spirit Airlines started commercial service from Latrobe to Fort Lauderdale, Fla., and Myrtle Beach, S.C. Traffic has since grown, and demand is expected to rise as Spirit expands its operations.

FUNDING

In February 2012, Congress passed an aviation reauthorization bill, and President Barack Obama signed it into law. The FAA Modernization and Reform Act of 2012 secures \$63.6 billion for the Federal Aviation Administration (FAA). In the past, the unstable nature of congressional funding extensions prevented the industry from planning for long-term projects and upgrades. By guaranteeing funding through 2015, the reauthorization allows airports to modernize services, improve safety, and upgrade infrastructure. Public airports depend on significant federal, state, and local investments. Aviation fees and taxes generate revenue for federal and state grants.

The Airport Improvement Program (AIP) distributes federal grant money to public airports directly from FAA and as a block grant through the Pennsylvania Department of Transportation (PennDOT). This grant covers 75 percent of approved projects for larger commercial service airports and 95 percent of approved projects for smaller reliever or general aviation airports.

Major commercial air service airports do not use tax dollars for day-to-day operations. They rely on federally approved departing passenger ticket user fees, or Passenger Facility Charges (PFCs). Federally capped at \$4.50, these charges fund major capital projects to ensure sufficient airfield and terminal capacity.

Federal grant eligibility is determined, in part, by the number of airport enplanements (the number of passengers boarding an aircraft at an airport):

- airports with less than 10,000 annual enplanements are eligible for \$150,000
- airports with more than 10,000 annual enplanements are eligible for higher levels of funding, based on their share of national enplanements

The PennDOT Bureau of Aviation administers three grant programs:

- the federal FAA Block Grant Program
- the state Aviation Development Program (ADP), which distributes approximately \$8 million a year from aviation fuel taxes
- the state Budget/Transportation Capital Assistance Program

For fiscal year 2012, Pittsburgh International Airport operates on a \$31 million annual capital budget allocated as follows:

- \$8 million in FAA AIP grant funds
- \$1 million in PennDOT Bureau of Aviation ADP grant funds
- \$2 million in PFC funds

- \$10 million in airport operating revenues, available due to the current 30-year contract with air carriers at PIT signed in 1988
- \$10 million in borrowed bond funds, due to the uncertainty of federal and state funding and the federal cap on PFC levels
- An additional \$15 million in PFCs for debt payments resulting from past FAA-approved capital projects

Additionally, under an agreement with ACAA, air carriers fund PIT's operating expenses through rental charges and landing fees. When airport usage goes down, fees go up to avoid a shortfall. This arrangement enables the airport to keep a balanced operating budget in the short term, but rising fees can encourage carriers to shift their business elsewhere.

Arnold Palmer Regional Airport is maintaining its current budget without major problems. The regional airport is gradually expanding from increased revenue while cutting costs with donations and federal surplus programs. Of its \$3 PFC, the airport receives \$2.85. LBE reached approximately 7,000 enplanements last year. If Spirit Airlines expands, that number could double and improve airport eligibility for federal grants, such as the Small Community Air Service Development Program grants.

Also, an FAA program to sustain essential air service provides subsidies to regional airports at least 70 miles from a hub, including those in Johnstown, DuBois, and Altoona. Latrobe, however, is too close to Pittsburgh to qualify.

PRIORITIES

The Allegheny County Airport Authority's five-year capital improvement plan for 2009–13 includes nearly \$140 million in proposed projects. The largest item is the last phase of a \$45 million storm water treatment plant to handle deicing fluid runoff. Other projects include improvements to runways, taxiways, runway safety areas, and the Pittsburgh Airport terminal as the Midfield Terminal complex becomes 20 years old. Another \$208 million in 2009–13 projects include additional runway upgrades and improvements to parking garages and the Pittsburgh Airport's people mover system. Airport pavement is much more expensive per mile than highway pavement. However, one mile of runway, unlike one mile of highway, can move people across the country.

The Westmoreland County Airport Authority is actively pursuing expansion of commuter service as part of a larger effort to restore regional service flights through Pittsburgh. Rebuilding the regional hub-and-spoke system means that affordable flights can connect numerous smaller cities with Pittsburgh International Airport. With time, this can encourage major carriers to increase their service to PIT. By planning for the future, regional airports can become even more self-sufficient

and sustainable, especially in the face of diminishing state and federal subsidies.

Among its priorities, LBE plans to support the growth and success of its airlines and fixed-base operators.

- In its partnership with LBE, Spirit Airlines provides the planes and flight service. The airport is responsible for towing, turning planes, customer service, servicing planes, and marketing. Increased revenues pay for operational costs, expanding airport facilities, and improving infrastructure.
- Fixed-base operator L.J. Aviation provides the pilots and scheduling for companies that participate in fractional aircraft ownership. Rather than purchasing their own planes or depend on commercial service, these companies choose to buy into an ownership structure similar to a time-share.



Arnold Palmer Regional Airport in Latrobe, Pa.

CHALLENGES AND OPPORTUNITIES

Funding. The PIT capital improvement program significantly exceeds anticipated funding. Each year, an additional \$20 million in needed capital projects at PIT are deferred due to insufficient funding. Over time, this leads to rising project costs as those deferred projects, which would have been preventative in nature, now become projects that require immediate attention.

Regional service airports face a unique challenge in having to support major airlines. These airlines will not provide service without revenue guarantees from the airports. Public general aviation airports would benefit from increased and less-restrictive federal and state grant funding. These airports do not have scheduled commercial air service and obtain grants from aviation-related taxes and fees.

Price of fuel. The fluctuating price of fuel continues to be a challenge for airline budget planning. As fuel prices increase, service decreases and may become more expensive, thereby impacting airport revenue.

Flexible Passenger Facility Charge (PFC). These funds are an efficient way to pay for airport improvements. Traditionally, airports use these fees to fund FAA-approved projects that enhance safety, security, or capacity; reduce noise; or increase air carrier competition. However, airports would prefer more flexibility to adjust the PFC in consultation with their air carriers. Major public airports with commercial air service would benefit from lifting the \$4.50 federal cap on PFC, with authorization to make increases tied to inflation.

THE FAA NEXT GENERATION AIR TRANSPORTATION SYSTEM

What is NextGen?

The Federal Aviation Administration (FAA) is working in collaboration with the aviation community to modernize the National Airspace System. The Next Generation Air Transportation System (NextGen) will transform the current radar-based air traffic control system into a satellite-based system. Airlines, manufacturers, universities, and all levels of government have agreed to help implement these changes across the industry. The FAA Modernization and Reform Act of 2012 secured long-term funding for FAA, part of which will go toward NextGen deployment.

The initiative plans to generate numerous benefits, including:

- improved aviation safety, capacity, and efficiency;
- increased investment in runways, terminals, technology, and other infrastructure; and
- reduced environmental impact from fuel burn, carbon emissions, and noise pollution.

Key improvements include the following:

- **Airport Surface Detection Equipment Model X (ASDE-X):** Air traffic controllers depend on information from FAA systems such as ASDE-X. Presently, this system relies on data from surface surveillance sources such as radar, which can be affected by bad weather. Converting the system to GPS will improve awareness and surface management.
- **Automatic Dependent Surveillance-Broadcast (ADS-B):** An ADS-B capable aircraft uses an ordinary GPS receiver to derive its precise position and then combines that information with aircraft variables, such as speed and altitude, to simultaneously broadcast to other ADS-B capable aircrafts its real-time position. This makes it easier to reduce air separation zones and to increase the capacity in the skies.

- **Tailored Arrivals:** Using real-time data, controllers will tailor incoming flight paths to travel the best routes and avoid conditions such as bad weather and restricted airspace.
- **Optimized Profile Descent:** Aircraft will fly at the most efficient altitude for as long as possible before approaching the airport. Pilots will use satellite-based approaches, including Area Navigation (RNAV) and Required Navigation Performance (RNP), to enable quick and efficient landings.
- **Oceanic Trajectory-based Operations:** Flights will be able to travel along the most efficient routes and altitudes across the oceanic environment.

NextGen Advanced Technologies:

- **Next-generation Data Communications:** Controller and pilot communication will switch from labor-intensive radio to faster electronic data communications.
- **Systemwide Information Management:** All NextGen systems will be able to communicate with one another.
- **Next-generation Network-enabled Weather:** Traffic management will have access to more accurate forecasting, especially for severe weather such as thunderstorms and icy conditions.

Learn more about NextGen: www.faa.gov/nextgen

RESOURCES

Allegheny County Airport

www.pitairport.com/AGC_background

Allegheny County Airport Authority

www.flypittsburgh.com/ACAA_background

Arnold Palmer Regional Airport

www.palmerairport.com

Federal Aviation Administration

www.faa.gov

PennDOT Bureau of Aviation

www.dot.state.pa.us/Internet/Bureaus/pdBOA.nsf/AviationHomepage

Pittsburgh International Airport

www.flypittsburgh.com

Westmoreland County Airport Authority

www.palmerairport.com/html/wcaa.html



ELECTRICITY

Significant state and federal legislation across the country is enabling utilities to control energy costs in order to reduce consumption. Devices such as smart meters will have the ability to regulate energy use by adjusting prices according to the time of day and special circumstances. Additional legislation seeks to limit the amount of power generated and made available to consumers. Other proposals call for more energy generation from renewable resources such as wind and solar. New smart grid technology will allow for more efficient, safer, and environmentally friendly operation of the electric power transmission system.

CONTEXT

Since 1970, the average household demand for electricity has jumped by more than 30 percent. However, aging power lines are overloading, sparking serious safety concerns. Aboveground, power lines are vulnerable to extreme weather conditions. For instance, the 2011 Halloween nor'easter left more than 2 million households without power for nearly a week. Serious blackouts and rolling brownouts will become even more frequent in the future if infrastructure is not adequately maintained and upgraded.

Prior to deregulation of the electric industry in 1999, seven major utilities owned and operated their own electric generation, transmission, and distribution facilities in Pennsylvania:

- West Penn Power
- PPL Corporation
- PECO Energy Company
- Penn Power
- Penelec
- Met-Ed
- Duquesne Light

Since deregulation, transmission lines have fallen under the control of a regional transmission organization (RTO), which controls the flow of electricity from generators in multiple states. The RTO for most utilities in Pennsylvania is PJM, which has more than 1,270 generation sources and 795 member companies. These lines are still owned and maintained by the local utilities, but the utilities need permission to take lines out of service for repairs or upgrades. By consolidating transmission and generation services, utilities seek to provide more cost effective and reliable service. In Pennsylvania, the Public Utility Commission regulates utility profits, electricity reserves, and consumer rates.

Electric utilities have been around for more than a century. Many began as municipal systems that expanded with the trolleys, railroads, and roadways. As Pennsylvania's economy grew, utilities invested in infrastructure such as power plants. Transmission lines connected these plants to substations and distribution circuits serving very specific electric demand fueled by the region's economic growth. In the 1970s, utilities stopped building generating facilities because of the oil crisis and environmental legislation.

With the recession in the early '80s and the collapse of the steel industry, electric utilities suddenly generated much more power than they needed and started selling excess power to neighboring utilities and states. Regulations also opened opportunities for nontraditional electric generators and suppliers. Municipalities and industries started using by-products to produce electricity. Major utilities were required to purchase nontraditional power whether it was needed or not.

PRIORITIES

Pennsylvania's numerous coal reserves fuel much of the electricity generated in the state. At the same time, demand for green power is growing, and wind turbine and solar panel farms continue to build up across the state. But regardless of the energy source, electricity still must travel through the same aging infrastructure that has limited capacity.

The U.S. Department of Agriculture Rural Development program is exploring opportunities for small-scale renewable energy production. Through this initiative, there are a wide variety of programs and funding available to agricultural producers and rural business owners. Projects aimed at increasing energy efficiency include solar panel and wind turbine installation, the construction of biorefineries, and the conversion of older heating sources to ones utilizing cleaner technology.

CHALLENGES AND OPPORTUNITIES

Legislation. With growing awareness of the impact of energy use on climate change, an array of state and federal legislation has sought to regulate all aspects of electric utilities, from infrastructure to implementation.

- Pennsylvania's coal industry has gained much attention as a source of electricity generation. Growing demand focuses on finding alternatives and supplementing coal production with wind turbines and solar panel farms.
- Federal renewable electricity standards legislation proposes that utilities provide at least 25 percent of their electricity from renewable resources by 2025. Pennsylvania has implemented a renewable electricity requirement, including

a broader mix of qualifying energy sources. The state Alternative Energy Portfolio Standards (AEPS) Act requires that 18 percent of electricity sold to customers be derived from renewable resources by 2020.

- Federal carbon capture and storage (CCS) legislation may require electric distribution companies (EDCs) such as Allegheny Power to help fund CCS projects. Early deployment of this legislation would create a national wires fee on EDCs, not on generators. The fee would be applied to the delivery of electricity generated by fossil fuels. This legislation intends to raise more than \$1 billion for use exclusively on large-scale CCS projects.
- Pennsylvania's Act 129 of 2008 energy efficiency and conservation program required EDCs to reduce electricity consumption by 1 percent by May 31, 2011, and 4 percent in the highest hours of peak demand by May 31, 2013.

The program also requires that every home and business be equipped with a smart meter within 15 years.

EDCs plan to meet the requirements of Act 129 in a number of ways:

- Rebates will encourage consumers to replace older appliances with high-efficiency models.
- Commercial and industrial customers are being offered incentives for retrofits that incorporate energy efficient measures. Examples include instituting sustainable designs, compact fluorescent lights, and remotely managed thermostats, amongst other items.
- Free energy audits and seminars will educate consumers on how to use energy more efficiently, help the environment, and save money.



U.S. NATIONAL SMART GRID INITIATIVES

What is the Smart Grid?

The electrical grid is the network of devices that deliver electricity to consumers. Making the grid “smart” requires integrating computer processing technology to computerize the network infrastructure. Whereas many electrical utilities send people to gather data on site, smart devices can gather data using sensors and can digitally communicate with the utility company. A key feature for utilities will be the ability to have centralized control of the grid, with the power to remotely adjust and control millions of devices on their networks.

The U.S. Department of Energy (DOE) is leading efforts to modernize the nation’s aging electricity delivery system and transform it into a “smart grid.” Title XIII of the Energy Independence and Security Act of 2007 provides legislative support for DOE’s smart grid activities. DOE’s Office of Electricity Delivery and Energy Reliability has partnered with key stakeholders to identify principal characteristics for the national smart grid program, including the following:

- Ability to self-heal from power disturbances
- Resilient operation against physical and cyber attack
- Power quality that fulfills 21st-century needs
- Accommodation of all generation and storage options
- Innovation of new products, services, and markets
- Optimization of assets and efficient operation

Key benefits:

- Enhanced cybersecurity
- Better use of alternative energy sources such as wind and solar power
- Integration of electric vehicles into the grid
- Improved reliability, resiliency, flexibility, and efficiency of the electric delivery system

The Office of Electricity Delivery and Energy Reliability also developed a smart grid primer to explore the challenges and opportunities of implementing the smart grid. Specific versions focus on information relevant to stakeholder groups including consumer advocates, utilities, technology providers, regulators, policy makers, and environmental groups. These publications are available on the Smart Grid Web site at www.energy.gov/oe/smart-grid-primer-smart-grid-books.

Learn more about the national smart grid initiatives at www.energy.gov/oe/technology-development/smart-grid.



RESOURCES

Allegheny Energy

www.fes.com/content/fes/home/allegheny.html

CONSOL Energy, Inc.

www.consolenergy.com

Duquesne Light

www.duquesnelight.com

Pennsylvania Act 129 Energy Efficiency and Conservation Program

www.puc.state.pa.us/electric/Act_129_info.aspx

Pennsylvania Public Utility Commission

www.puc.state.pa.us

PJM

www.pjm.com

U.S. Department of Agriculture Rural Development

www.rurdev.usda.gov

U.S. Department of Energy

www.energy.gov

U.S. Environmental Protection Agency Renewable Portfolio Standards

www.epa.gov/chp/state-policy/renewable_fs.html



FLOOD CONTROL AND DAM SAFETY

Flooding is a long-standing problem in the region, and ineffective storm water management is making the problem increasingly hazardous. More thoughtful approaches to development and storm water control can reduce the volume of runoff. The Pennsylvania Stormwater Management Act requires counties to adopt watershed-based storm water management plans and requires municipalities to implement ordinances to regulate these plans. Storm water containment and regulation vary by municipality, and many communities depend on state flood control projects. Following the collapse of dams in Johnstown in 1889 and Potter County in 1911, Pennsylvania became the first state to enact dam safety legislation. The Pennsylvania Dam Safety and Encroachments Act gave the Department of Environmental Protection (DEP) the authority to regulate dams and other water obstructions.

KEY PLAYERS

Pennsylvania has approximately 3,200 dams, one-fourth of which are categorized as “high hazard” because their failure could result in extensive property damage and loss of life. Southwestern Pennsylvania has 637 dams, 197 of which are high hazard. The DEP Division of Dam Safety is responsible for regulating these dams, which are almost evenly split between public and private ownership. Many are still privately owned, while others are owned by public water authorities and government agencies, including the Pennsylvania Department of Conservation and Natural Resources (DCNR) and the Fish and Boat Commission.

The U.S. Army Corps of Engineers built a system of 16 multi-purpose flood control reservoirs and 42 local protection projects in the region. These projects return more than \$20 in flood damage prevention for every \$1 invested. The corps conducts routine infrastructure checkups every year and in-depth inspections every five years. With this system, the corps can control the flow of water in response to local conditions. During hurricanes and spring storms, reservoirs can prevent major flooding. In periods of low flow, releasing stored water can alleviate drought conditions for the navigation industry. Reservoirs also help to mitigate environmental pollution from industry. By adjusting the rate of water flow from the reservoirs, the corps can dilute nonpoint source pollution in our water supply.

FUNDING

In 2012, the Commonwealth Financing Authority allocated more than \$48.9 million in flood control grants, and more than \$52.6 million in high hazard unsafe dam grants. Of the \$50 million set aside for high hazard dams, all of it has been spent on rehabilitation. Dam projects receive funding from the state capital budget, DEP Growing Greener grants, and private sources. Pennsylvania Infrastructure Investment Authority (PENNVEST) also considers applications for funding maintenance of public water supply dams.

Both the Corps of Engineers and DEP participate in flood control projects. The corps usually deals with larger waterways, such as Chartiers Creek after it was devastated by Hurricane Ivan in 2004. The agency provides federal funding equal to 65 percent of the project’s cost. Under Act 167, DEP provides technical assistance and defrays 75 percent of the costs for flood control development plans and 75 percent of the costs for planning administration.

Local communities share the costs of flood damage reduction projects and often take over maintenance responsibilities after completion. Some counties shift the cost to individuals who benefit from green flood control projects. While projects can become liabilities in the long term, the corps offers federal funding to assist with repairs if local owners maintain their dams. Plus, owners then become eligible for national flood insurance.

PRIORITIES

DEP maintains 29 flood protection projects in the Ohio River Basin, all of which are considered to be in acceptable condition. However, one project covering nearly two miles of Jacks Run in Greensburg is rapidly deteriorating and slated for major rehabilitation. This is one of nine projects scheduled for construction within the next five years, at a total estimated cost of \$52 million. When sites are damaged by flooding, engineers can restore them to operable condition but cannot do any additional repairs. Debris can only be removed within the footprint of an original project.

DEP estimates that the repair costs for 15 publicly owned high hazard dams include the following:

- One DCNR dam in Greene County funded in the state budget at \$30 million
- Eight Fish and Boat Commission dams that are not funded and have an estimated rehabilitation cost of \$52 million
- Six municipal dams in the southwest region with an estimated repair cost of \$14 million

While DEP has enforcement power over privately owned dams, no state programs assist with expensive private dam rehabilitation. When a dam is unnecessary, the agency encourages removal for the following reasons:

- Continuous maintenance is expensive, but state funding is available for removal.
- Private owners are responsible for the liabilities posed by high hazard dams.
- Dams can negatively impact the local watershed ecosystem.

CHALLENGES AND OPPORTUNITIES

Legacy costs. Over the years, local industrial activities have impacted water quality and flood control measures.

- The lumber industry harvested trees, reducing the capacity of the soil to absorb water. As a result, more water flows into sewers and floods waterways.
- Abandoned coal mines fill up with water and lead to acid mine drainage, causing dangerous quantities of minerals and toxic metals to enter the environment.

Local initiatives. Communities in northern Allegheny County are collaborating to develop new detention ponds for slowing down water runoff into Girty's Run. Low-impact development approaches include the use of rain barrels and rain gardens as well as reducing the number of impervious surfaces.

RESOURCES

American Society of Civil Engineers 2010 Report Card for Pennsylvania's Infrastructure—Dams and Levees

www.pareportcard.org

Commonwealth Financing Authority

www.newpa.com/find-incentives-apply-for-funding/commonwealth-financing-authority

Pennsylvania Department of Conservation and Natural Resources

www.dcnr.state.pa.us

Pennsylvania Department of Environmental Protection (DEP)

www.dep.state.pa.us

Pennsylvania DEP Bureau of Waterways Engineering

www.depweb.state.pa.us/portal/server.pt/community/waterways_engineering/10499

Pennsylvania Fish and Boat Commission

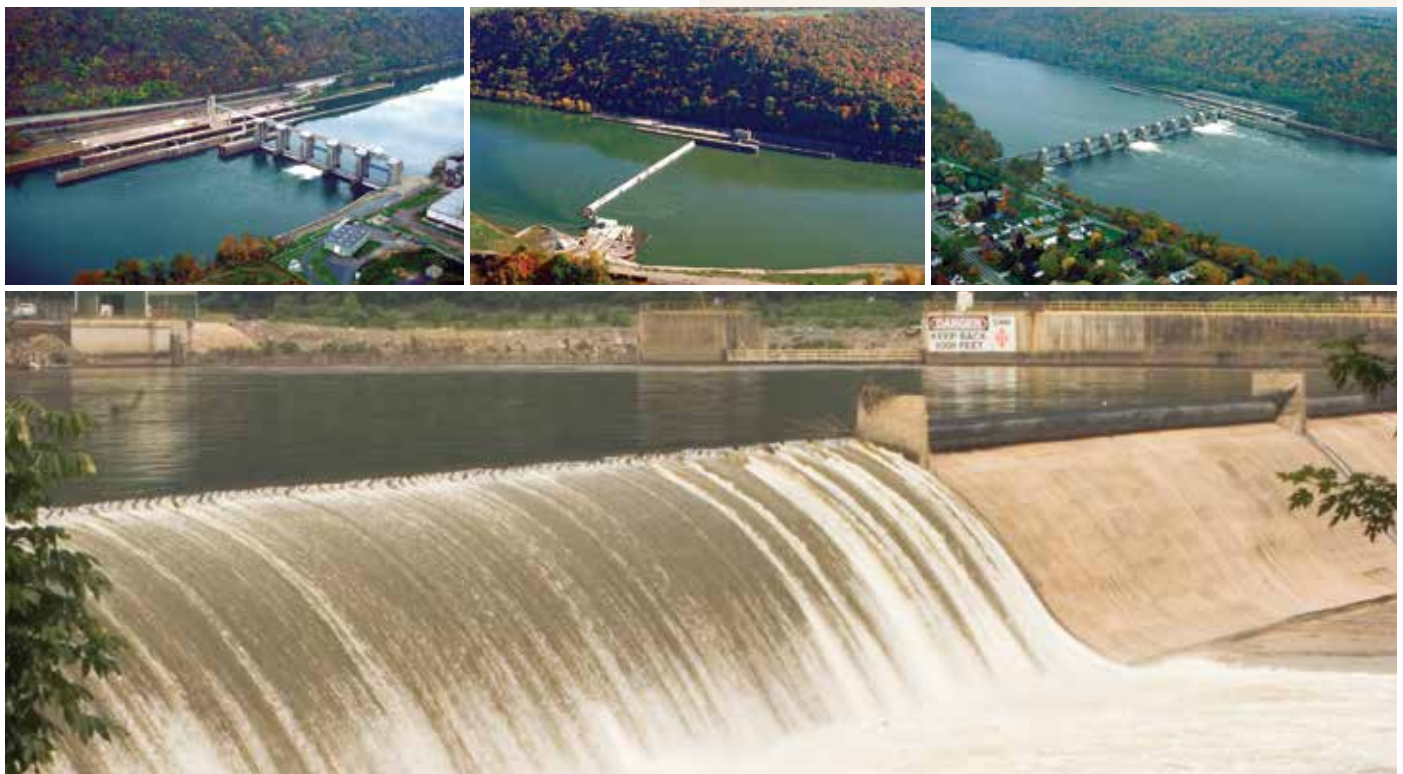
www.fish.state.pa.us

Pennsylvania Infrastructure Investment Authority

www.pennvest.state.pa.us

U.S. Army Corps of Engineers Pittsburgh District

www.lrp.usace.army.mil



Top: Locks and dams under the jurisdiction of the Pittsburgh district of the U.S. Army Corps of Engineers



NATURAL GAS

In Southwestern Pennsylvania, natural gas makes up more than 90 percent of home heating markets and more than 60 percent of water heating markets. Three major natural gas distribution companies operate the region's natural gas infrastructure: Columbia Gas of Pennsylvania, Equitable Gas Company, and Peoples Natural Gas. All three are regulated by the Pennsylvania Public Utility Commission (PUC). Together, these utilities serve hundreds of thousands locally and maintain about 20,000 miles of gas pipeline and several underground storage facilities. Each maintains critical transmission links extending outside the state, throughout the eastern seaboard, and to the Gulf Coast.



KEY PLAYERS

Columbia Gas serves approximately 414,000 customers in 26 counties throughout the state. Equitable Gas serves approximately 275,000 customers in Southwestern Pennsylvania, West Virginia, and Kentucky. Peoples Natural Gas serves approximately 360,000 homes and businesses throughout 16 counties in Western Pennsylvania. Distribution companies have seen a steady decline in regional population and commercial industry in recent years.

FUNDING

Gas distribution companies are separate from state gas suppliers. According to state law, distribution companies may not make a profit on selling gas. In order to recover the costs of gas, companies submit quarterly filings reflecting these expenditures and PUC compensates them. These companies can only make a profit from operating the pipeline system. Funding to maintain infrastructure comes from ratepayers as well as corporate investors.

To receive an increased return, utilities can file a rate case with PUC. A rate case is an extensive, public, negotiated process requiring a detailed review of company expenses and revenues as well as projected costs for the next 12 months. Interested parties can review rate case filings, ask questions, and negotiate an agreeable settlement with the utility. When settlements are not achieved, the rate case is litigated before the commission. In all cases, PUC must approve any rate change before it can take effect.

Due to the considerable cost of pursuing a rate case, companies seldom make requests for small increases. As a result, rather than gradual increases, rate changes often spike customer charges. And with fluctuating gas prices, companies make no fewer than four rate filings a year. The process can take as long as a year to prepare and complete.

Pennsylvania House Bill 1294 amended Title 66 (Public Utilities) to enable water, wastewater, natural gas, and electric utilities to apply for a distribution system improvement charge (DSIC). This charge provides an alternative rate-making mechanism to encourage timely and predictable cost recovery. To be eligible, companies will be required to file long-term infrastructure improvement plans with PUC. DSICs encourage companies to accelerate investments in infrastructure, spread the costs out over time, and reduce base rate increase filings.

PRIORITIES

Upgrading aging pipes in older communities is increasingly important. Pipes slated for replacement may range in age from several decades to more than 100 years old. Companies are moving to replace the original bare steel, cast iron, wrought iron, and copper pipes with new plastic pipe to ensure pipeline safety and reduce maintenance costs.

CHALLENGES AND OPPORTUNITIES

Service line ownership. In the rest of the state and most of the country, gas utilities own the gas lines connecting street-level main distribution lines with customer households. When a leak occurs in these service lines, the company automatically fixes the problem at no direct charge to the customer. In Western Pennsylvania, however, customers are responsible for these lines. In the event of an incident, gas companies simply turn the gas off and wait for the customer to arrange repair.

The local industry is interested in legislative changes to enable distribution companies to take responsibility for all service lines. PUC and relevant legislative committees still need to formally review the proposal. If enacted, the proposal aims to streamline the pipeline repair process and improve safety.

Permitting policy. Municipalities are prohibited from using the permitting process as a means of making a profit, but some have reportedly enacted large increases in permitting fees after learning about gas company repair plans. Permitting policies vary, with some municipalities charging up front. Others impose expensive restoration requirements such as expecting a utility to repave the entire road, even if only one shoulder of a road is dug up.

Workforce development. The industry reports some difficulty in securing a qualified workforce, as contractors have expressed

concern about whether they can handle the work associated with infrastructure replacement. Labor organizations support the industry request for DSIC authority. They prefer a stable funding source for long-term contracting opportunities rather than the stop-and-start approach fostered by the pattern of periodic rate cases.

Maintenance coordination. When a gas company digs along a roadway to do maintenance, it creates an opportunity for water and sewer repairs to happen at the same time. Similarly, restoration work could be coordinated with road paving plans.





RESOURCES

Columbia Gas of Pennsylvania

www.columbiagaspa.com

Equitable Gas Company

www.equitablegas.com

Pennsylvania Public Utility Commission

www.puc.state.pa.us

Peoples Natural Gas

www.peoples-gas.com



Locks and dams under the jurisdiction of the Pittsburgh district of the U.S. Army Corps of Engineers

NAVIGABLE WATERWAYS

Water transportation is generally the most cost-effective way of moving freight. The Port of Pittsburgh is the nation's second busiest inland port and one of the top 25 in terms of freight tonnage. These waterways support more than 45,000 local jobs and enable the movement of more than \$9 billion worth of goods each year. Locks and dams are some of the infrastructure elements that enable all this traffic. These structures require sustained maintenance and investment, but financial limitations undercut these efforts. Deteriorating infrastructure threatens the health of the regional economy as well as the livelihoods of local families and businesses.

KEY PLAYERS

The Pittsburgh Port District consists of all 200 miles of commercially navigable waterways in Southwestern Pennsylvania. These waterways extend throughout a 12-county area and include the three major rivers: the Allegheny, the Monongahela, and the Ohio. More than 200 river terminals and barge industry service suppliers depend on the safe and stable operation of the Port of Pittsburgh. On average, 40 million tons of freight passes through each year, 80 percent of which is coal. The recession has slowed activity, but growing interest in nonhighway freight transportation is expected to drive up demand in the Ohio River Basin.

The U.S. Army Corps of Engineers is the world's largest public works agency and works with the U.S. Geological Survey and the National Weather Service to manage the nation's extensive waterway system. Among its many responsibilities, the agency monitors the regional waterways, manages water resources, and addresses water quality issues. The Pittsburgh District is one of seven districts in the Great Lakes and Ohio River Division and is organized by watershed basins. To make this network navigable, the corps operates 17 locks and dams on the three major rivers as well as six structures in neighboring Ohio and West Virginia.

- Allegheny River: Lock and Dam 2, C.W. Bill Young Lock and Dam, and Locks and Dams 4–9
- Monongahela River: Braddock Locks and Dam, Locks and Dams 3 and 4, Maxwell Locks and Dam, Grays Landing Lock and Dam, Point Marion Lock and Dam, Morgantown Lock and Dam, Hildebrand Lock and Dam, and Opekiska Lock and Dam
- Ohio River: Emsworth Locks and Dams, Dashields Locks and Dams, Montgomery Locks and Dam, New Cumberland Locks and Dam, Pike Island Locks and Dam, Hannibal Locks and Dam

The Port of Pittsburgh Commission is the government agency responsible for managing the Port of Pittsburgh. The commission serves 11 counties in Southwestern Pennsylvania plus Blair County. The agency promotes economic development, functions as a clearinghouse of information, and connects businesses with the resources they need to make use of the waterways.

FUNDING

The waterways receive funding from the discretionary portion of the federal budget. The federal government pays for half the infrastructure construction costs. The Inland Waterways Trust Fund provides the local matching money, generated through a 20 cents/gallon fuel tax on the towing industry, the cost-sharing sponsor. Unfortunately, the trust fund is severely depleted, limiting local contributions and delaying project construction.

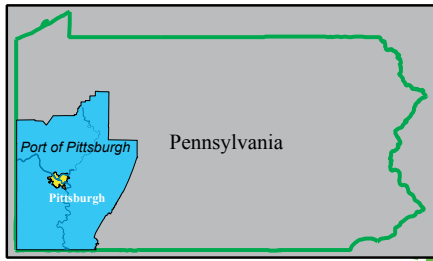
In the proposed FY 2011 budget, the Obama administration reinstated its lockage fee proposal to replace the marine diesel tax as a source of revenue for the trust fund. The barge and towing industries have resisted any increases in their tax burden, noting that other river users do not contribute to the fund at all. The industry is particularly opposed to lockage fees, which would have an onerous and disproportionate impact on head-waters regions where many locks are required, such as Southwestern Pennsylvania.

Congress also appropriates project funds on a year-to-year basis. This often limits the Corps of Engineers' ability to deliver navigation benefits within a reasonable timetable. The agency dedicates most of its annual budget to flood control, coastal emergencies, and inland waterways. The rest is applied to construction projects and infrastructure maintenance.

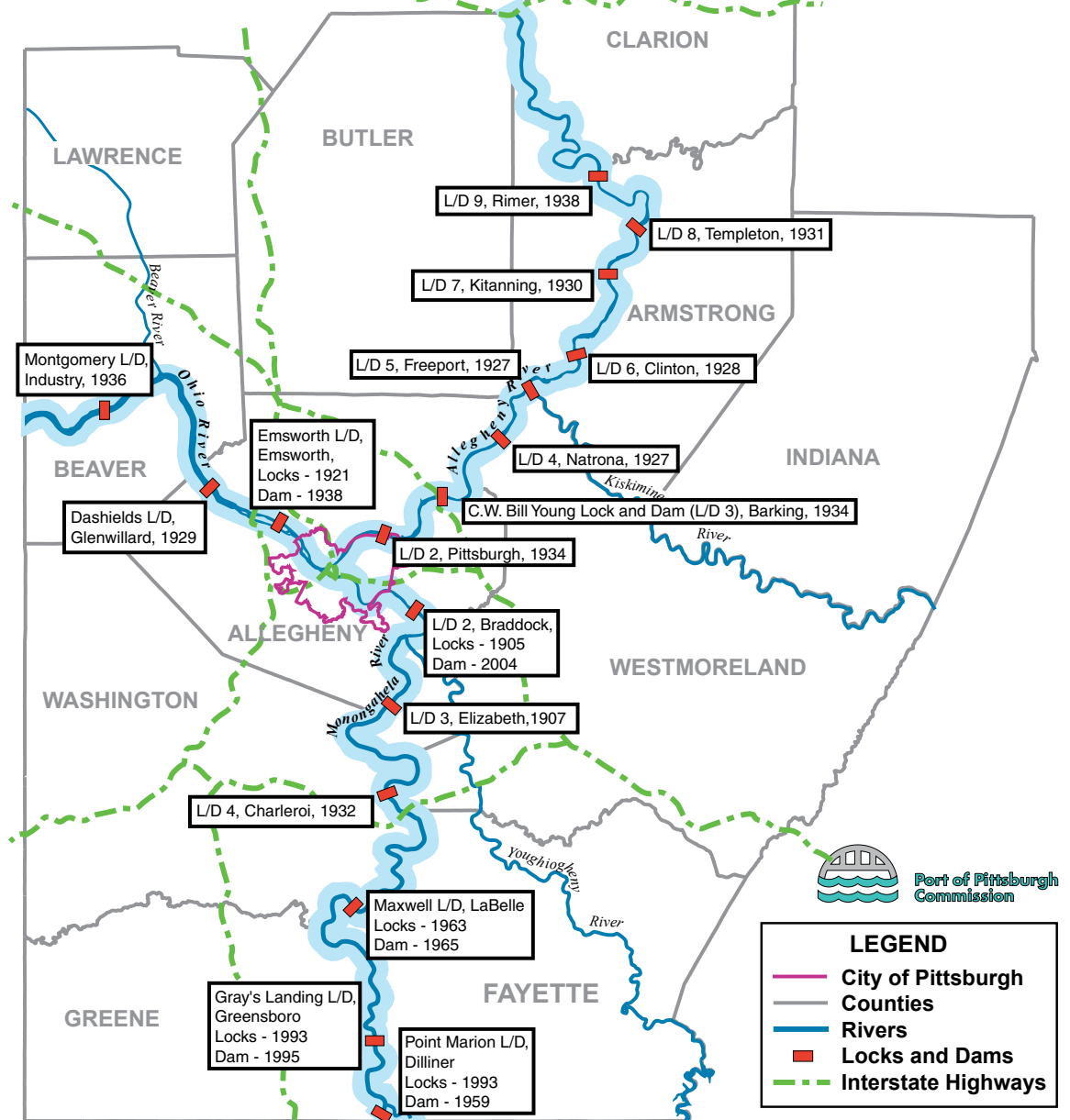
The Port of Pittsburgh Commission offers a variety of bonds, grants, and loans to fund waterway development. For instance, the commission recently secured funding from the National Clean Diesel Funding Assistance Program. This federal program provides funding for proposals to significantly reduce diesel air pollution and emissions exposure. Local towboat operators have used the funding to convert their fleets to more efficient, cleaner-burning diesel engines.

PRIORITIES

The Corps of Engineers conducts routine inspections every year and performs more in-depth inspections every five years. Most waterway structures in the region are 60–80 years old and have a significant backlog of repairs and projects.



The Port of Pittsburgh's Locks and Dams



Upper Ohio Study

The locks and dams at Emsworth, Dashields, and Montgomery are the oldest and smallest on the Ohio River. Structural deficiencies limit the economic opportunities for efficient river transportation, but more than \$2 billion is needed to improve them. The Emsworth lock and dam is in the middle of a five-year multimillion dollar emergency repair project to mitigate serious erosion and replace dangerously corroded gates.

Lower Mon Project

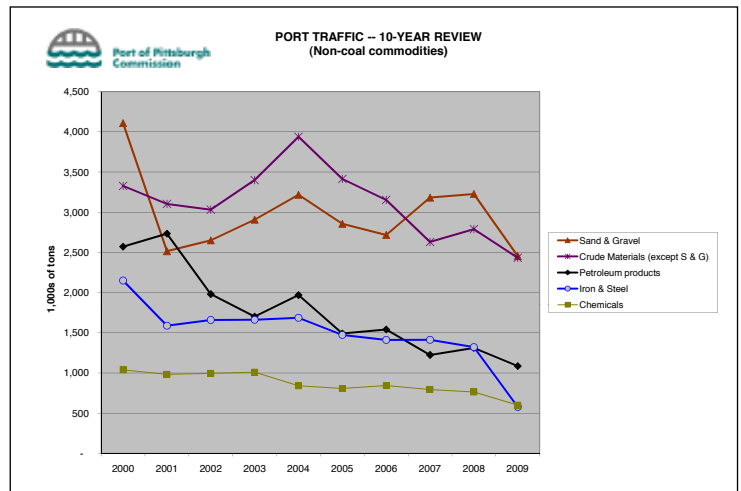
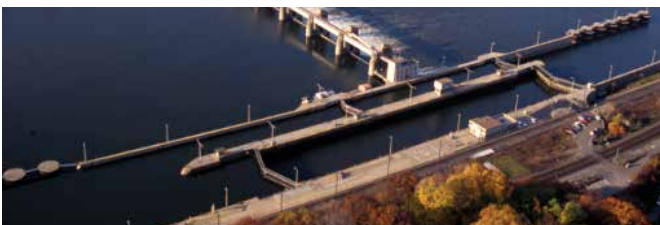
The Corps of Engineers took on the ongoing lower Monongahela River navigation project in order to address issues with lock and dam structures at Braddock, Elizabeth, and Charleroi. Authorized in 1994, the project initially anticipated a 12-year schedule to replace the Braddock dam; replace Locks and Dam 4, located in Charleroi, Pa.; and remove Locks and Dam 3, located in Elizabeth, Pa., all classified as “critically near failure.”

Unfortunately, lack of local matching money is forcing the corps to complete the project one piece at a time, as funding allows. The corps completed the replacement of the Braddock dam in 2004. Replacement of the Locks and Dam 4 is in progress. Removal of Locks and Dam 3 is still on the horizon. The pool between Elizabeth and Charleroi is one of the region’s most important, with jobs at two power plants and a coke works depending on its safe navigation.

In the meantime, taxpayers are paying for the higher costs of drawn-out projects. Mobilizing contractors to work on projects in a piecemeal fashion can become expensive. The public and industry loses out on potential benefits for each day the project remains uncompleted. Delays also lead to wasteful emergency repairs on structures already slated for removal. For example, inadequate funding has pushed the completion date for the removal of Locks and Dam 3 into 2020 and beyond.

Allegheny River

The Allegheny sees less traffic than the other rivers because of its smaller locks. Less traffic has led to less investment and any rehabilitation would require up to \$50 million. These structures have long been on a “fix as fail” repair basis but are now managed as “fail and close.” Over the past year, the Corps has reduced hours on Locks and Dams 8 and 9 on the Allegheny River. There also has been talk of potentially closing them down entirely in the near future.



CHALLENGES AND OPPORTUNITIES

Funding

Waterways receive baseline funding, but more funding is needed to maintain the system. The Inland Waterways Trust Fund fuel tax is frozen at 1992 levels. As an alternative funding stream, the Inland Waterways User Board proposed an increase to the user fee from 20 cents to 26–29 cents per gallon for the commercial towing industry. The proposal would emphasize completion of projects already in progress in the 20-year capital improvement plan, with priorities on dam safety, condition assessment, and economic return. The plan also shifts lock repairs of less than \$100 million and 100 percent of dam repairs to federal cost.

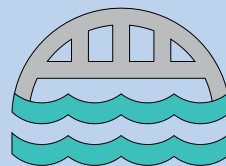
With the support of more than 120 industry groups, this proposal offers major improvements over the current plan. However, there are complications:

- Even with immediate passage of the plan, the Lower Mon Project would not be completed until 2023.
- Competing legislative agendas make it difficult for this legislation to get sufficient priority to be passed.
- No funding for the Ohio River improvements were included in this plan, as the authorization report will not be completed for at least another year.
- This plan does not address the needs for annual maintenance, which threatens all the locks and dams in the region.

As the result of the budget crunch, the Corps of Engineers has been forced to cut back on vital services such as repair fleet operations. These specialized fleets conduct inspections, carry out repairs, and respond to emergencies. Service reductions lead to longer repair times and more frequent lock/dam closures. Maintenance priorities have shifted from a proactive to a reactive condition-based approach. The focus is now on

The Inland Waterway System

334 Mileage Between Cities
3 Number of Locks



Port of Pittsburgh
Commission

repairing what is in most dire need and how severely its failure will affect the rest of the waterway. Regardless of the budget, extreme weather and emergency repairs also unexpectedly deplete limited resources.

Public interest

Public officials find it difficult to raise public interest in infrastructure problems that might become catastrophic years from now, but the goal is to raise awareness and funding before they are needed, rather than during an emergency. More residents will become aware of these issues as waterway problems begin impacting the operations of the U.S. Steel Clairton Plant, regional power plants, and other local industries.

Workforce development

The towing industry is concerned with the adequacy of the future workforce. It faces similar challenges as the trucking industry. Long periods of out-of-town travel make careers on the river unattractive to many people.

Intermodal freight transportation

The Port of Pittsburgh is connected to the CSX Corporation Inc. and Norfolk Southern Corp. railroads as well as to four interstate highways. Last-mile connections from highways to other transportation modes can promote waterway investment and develop intermodal networks. Waterways have plenty of available capacity, but the system is failing faster than capital reinvestment. American waterways also are not very high tech compared to European satellite-aided river information systems.

WIRELESS WATERWAYS IN THE PORT OF PITTSBURGH

The Wireless Waterway project aims to solve the communications problem on the nation's inland waterways. The plan proposes to construct a reliable waterway communications network that uses the Internet. This network will utilize wireless network technologies such as Wi-Fi, 3G, WiMAX, and satellite communications. Services will include broadband Internet connection, real-time navigation, cargo tracking, and operation of waterway surveillance devices. The first phase of the plan would install the wireless network at 200 locations, including 150 of the Corps of Engineers' 192 locks.

Main opportunities:

- Internet connectivity is a valuable service, especially in areas where other forms of communication are not possible.
- Various data services would be available for stakeholders to pay for what they need.

Key stakeholder needs:

- American waterways operators: voice communication, network coverage, cargo and vessel tracking, equipment monitoring

- Port of Pittsburgh Commission: promoting use of the waterways
- U.S. Army Corps of Engineers: safety, locking queue, accurate and automatic data collection
- U.S. Coast Guard: safety, security, and environment

Direct benefits:

- Accurate real-time data and network of information
- Improved safety, security, and productivity
- Platform for future innovation
- Prevention of incidents that can cost human lives and millions of dollars

Related benefits:

- Increased development and intermodal transportation
- Local and regional job creation along the waterways
- Opportunity for last-mile Internet connections to underserved communities along the waterways

Learn more about Wireless Waterway and other ITS initiatives:

Port of Pittsburgh Commission

www.port.pittsburgh.pa.us/home/index.asp?page=180

Traffic21

www.heinz.cmu.edu/traffic21/index.aspx

RESOURCES

American Society of Civil Engineers 2010 Report Card for Pennsylvania's Infrastructure—Navigable Waterways

www.pareportcard.org

Federal Emergency Management Agency

www.fema.gov

National Weather Service

www.weather.gov

Pennsylvania Fish and Boat Commission

www.fish.state.pa.us

Port of Pittsburgh Commission

www.port.pittsburgh.pa.us

U.S. Army Corps of Engineers Pittsburgh District

www.lrp.usace.army.mil

U.S. Coast Guard, Pittsburgh Unit

homeport.uscg.mil/pittsburgh

U.S. Environmental Protection Agency

www.epa.gov

U.S. Geological Survey

www.usgs.gov



Steel Plaza T station, Downtown Pittsburgh

PUBLIC TRANSIT

Ten public agencies deliver transit and paratransit service in Southwestern Pennsylvania. Buses are the most visible part of this public transportation infrastructure, but the system also is supported by garages, maintenance facilities, park-and-ride lots, transit passenger centers, and vehicles that provide additional services. The deterioration of roads and bridges can impact public transportation by forcing route changes and severe delays. As the price of fuel increases, transit ridership also tends to rise. At the same time as demand is growing, there is not enough equipment or money to meet these needs. Agencies also must juggle maintenance needs with the increasing demand for greener infrastructure.

KEY PLAYERS

The Port Authority of Allegheny County provides 97 percent of the transit services in Southwestern Pennsylvania. Twenty-five hundred employees operate, maintain, and support bus, light rail, incline, and paratransit services for nearly 230,000 daily riders. After the latest service reductions, the Port Authority experienced an immediate drop in ridership but saw a gradual increase in system productivity. The number of rides per service hour has grown by 15 percent. The agency later expanded its fleet of articulated buses to address overcrowding, as riders from eliminated routes flowed onto remaining buses.

The Westmoreland County Transit Authority (WCTA) provides service throughout Westmoreland County as well as commuter services to Pittsburgh and Johnstown. WCTA owns its buses and contracts with two private operators to provide bus service. It also owns a maintenance facility and a Greensburg transit center. The transit agency is at capacity in terms of vehicles and has experienced a 9 percent increase in ridership between 2010 and 2011.

FUNDING

Federal, state, and local sources fund public transit services. On the federal level, support remains unstable without a long-term authorization plan. The two largest federal funding programs are the block grant for transit systems in urbanized areas (Section 5307) and capital funds (Section 5309). State or local agencies must provide 5–20 percent matching funds, which are largely reliant on sales taxes and passenger revenue.

WCTA relies on PennDOT discretionary funds to provide the needed 20 percent match to receive federal funds for capital projects. These local funds are based on the bonding of the Pennsylvania Turnpike and have since run out. Due to the lack of Interstate 80 tolling and the subsequent PennDOT fund

shortfall, WCTA has frozen operating funds. The agency has been receiving relatively level funding and does not anticipate a funding problem in the short term. However, should the situation fail to improve, it may face issues similar to those currently affecting the larger transit agencies.

PRIORITIES

Port Authority

The North Shore Connector

The connector is an underground light rail line connecting the Downtown and North Shore neighborhoods of Pittsburgh. The project aims to alleviate congestion between the two areas during sports games and special events. The region received a specially earmarked \$348 million federal transit grant for this project. The line also may serve as a starting point for future rail extensions to the northern suburbs.

ConnectCard

With this new smart card system, bus riders will be able to swipe prepaid cards to pay fares. The system should help to reduce revenue losses from equipment failure and fare evasion. Participating regional transit agencies also may see smoother transitions between services. The Port Authority tested the system using University of Pittsburgh ID cards and plans to market the cards systemwide.

Green technology

The Port Authority recently purchased 20 additional electric hybrid buses and introduced biodiesel to the existing fleet. The number of articulated buses also grew from 50 to approximately 110.

WCTA aims to maintain current levels of service. The agency is coordinating a study of human service transit that contracts with local taxi companies. Paratransit service may be improved by consolidating paratransit transportation programs under PennDOT and developing common delivery standards across all programs. WCTA also recently purchased two 20-passenger electric hybrid vehicles as its first foray into green transportation technology.

CHALLENGES AND OPPORTUNITIES

Funding crisis

Act 44 of 2007 revamped the state's approach to transit funding, which has historically been generous but unpredictable. Under this act, public transit received \$953 million in the fiscal year 2007–08. Sources included \$300 million in bonds being repaid from future Pennsylvania Turnpike revenues along



Port Authority of Allegheny County bus in Pittsburgh's Oakland neighborhood

with funds from the state sales tax and the Pennsylvania Lottery. Act 44 funding was distributed for both capital and operating purposes, using formulas based on number of passengers carried, vehicle miles traveled, and vehicle hours operated. The act was intended to stabilize state transit funding but failed due to the lack of progress in both leasing the Pennsylvania Turnpike and tolling I-80.

Factors squeezing the Port Authority include a declining share of state funds (because of growth in central Pennsylvania transit systems) and a declining share of federal rail transit funds (as more cities have built rail lines) along with labor commitments. Many other metropolitan areas have approved broad local taxes to fund transit, most commonly through a sales tax increase. As a larger public transit agency, the Port Authority also faces growing labor legacy costs. Stock market losses from the recession resulted in a 30 percent decline in pension net asset values. The agency expects to make higher pension contributions to offset the losses.

For fiscal year 2012-13, the Port Authority is facing a \$64 million deficit in its operating budget. The agency also projects a \$45–90 million capital budget deficit for State of Good Repair projects. If no funding solution is developed, the agency will be forced to reduce service by 35 percent, raise fares, and lay off hundreds of employees. Downsizing will eliminate more than 40 routes out of 100 and reduce service on all remaining routes. Many city neighborhoods and suburban communities will lose access to public transit at a time when demand for service continues to grow.

Workforce issues

Agencies find it difficult to attract younger candidates with proper qualifications to work in the public transit sector. Applicants are often older than 30, and many are even at retirement age. Potential employees must pass drug screenings, hold a commercial driver's license, and demonstrate good customer service skills.

BUS RAPID TRANSIT IN PITTSBURGH

A cost-effective and flexible public transportation system, bus rapid transit (BRT) uses new technology and best practices to create a faster, more reliable bus service. The Port Authority built Pittsburgh's first dedicated busway in 1977. The South Busway used bus and rail service to connect Downtown and the South Hills communities. The agency also later constructed the East Busway and West Busway.

Today, the Port Authority is exploring ideas for building a BRT service along the Fifth and Forbes corridor between the busy Downtown and Oakland neighborhoods. The agency is a partner in a coalition of more than 30 local stakeholders, including urban planners, community groups, nonprofits, government agencies, businesses, and developers. Led by Sustainable Pittsburgh, Get There PGH is a partnership exploring and promoting the opportunities available in public transit, specifically in BRT.

Key features of BRT service:

- Exclusive bus lanes to allow buses to bypass traffic
- Traffic signal priority for buses
- Real-time transit information available at station message boards
- Off-board fare collection at the platform to reduce boarding times
- Low-floor buses with additional doors to reduce load/unload times
- Branded vehicles and infrastructure to set BRT routes apart from the rest of the transit system
- Bus stop amenities such as weather protection, bicycle racks, and security cameras

Predicted major benefits include the following:

- Economic growth
- Improved neighborhoods
- Safer streets
- Cleaner environment
- Thriving businesses
- Reliable travel
- Mobility and accessibility

Learn more about Get There PGH: gettherepgh.org

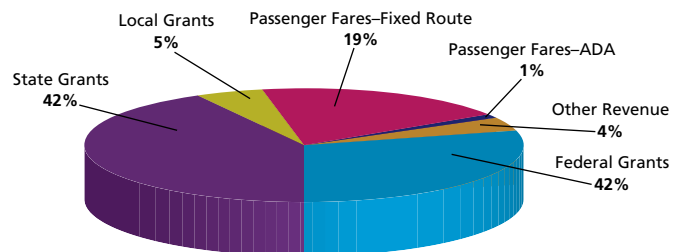


Westmoreland County Transit Authority bus

Westmoreland County Transit Authority

Transit Revenue by Source

FISCAL YEAR 2009



RESOURCES

American Society of Civil Engineers 2010 Report Card for Pennsylvania's Infrastructure-Transit

www.pareportcard.org

Federal Transit Administration

www.fta.dot.gov

PennDOT Bureau of Public Transportation

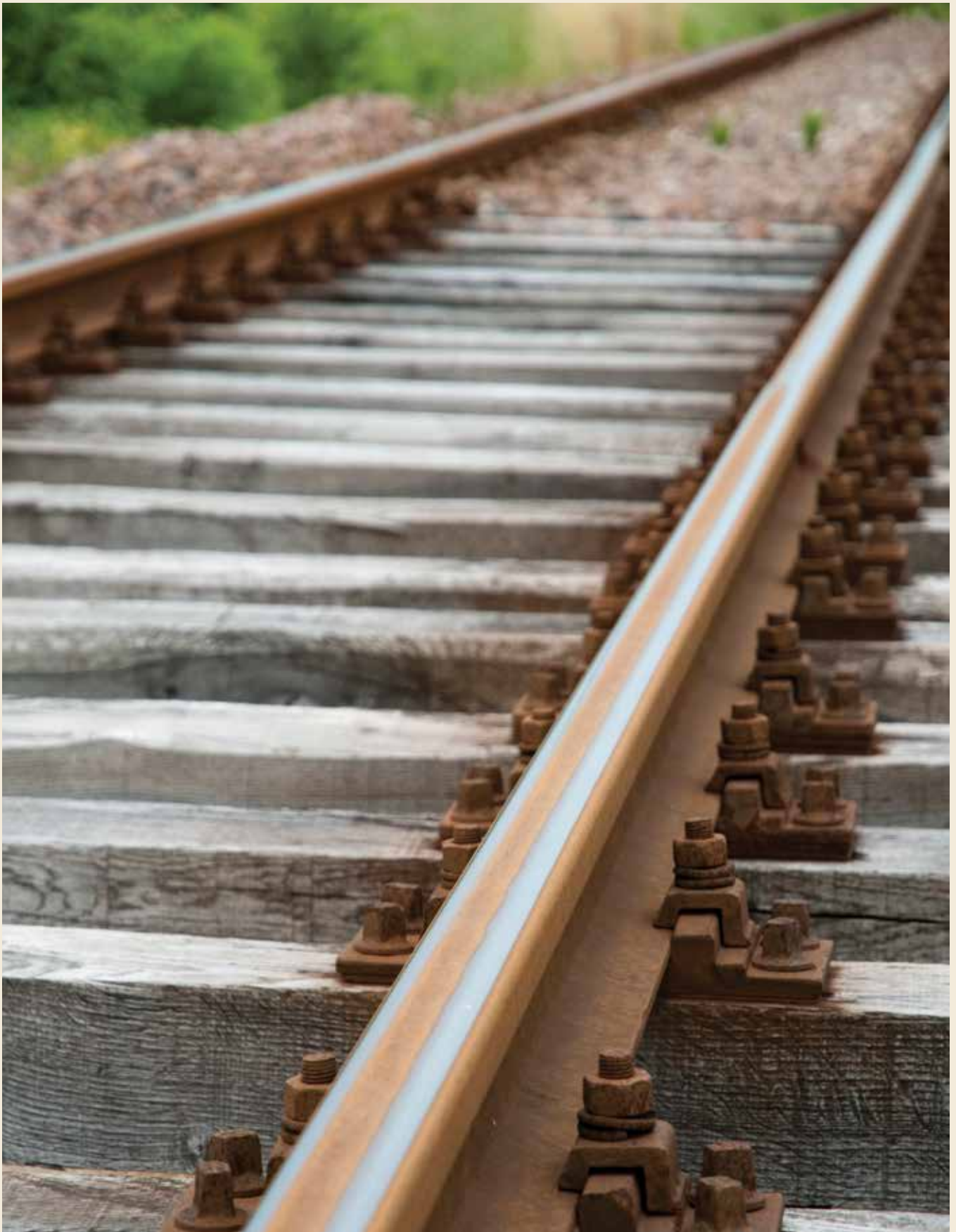
www.dot.state.pa.us/Internet/Bureaus/pdBPT.nsf/TransHomepage

Port Authority of Allegheny County

www.portauthority.org

Westmoreland County Transit Authority

www.westmorelandtransit.com



RAILWAYS

Historically, rail has served as a very cost-effective freight transportation system. At present, more than 1 billion tons of cargo travel through the state each year by rail. A single train is capable of moving a ton of cargo nearly 500 miles on a single gallon of fuel, making rail three times more fuel efficient than roadway transportation. However, much of the Pennsylvania railroad infrastructure was built more than a century ago. Today, railroad operations require increasingly expensive maintenance and upgrades to keep up with new safety and engine technologies. At the same time, overall demand has fallen with the decline in manufacturing over the years. However, companies predict that the lower costs of rail will attract more activity as fuel costs increase and highway congestion grows.

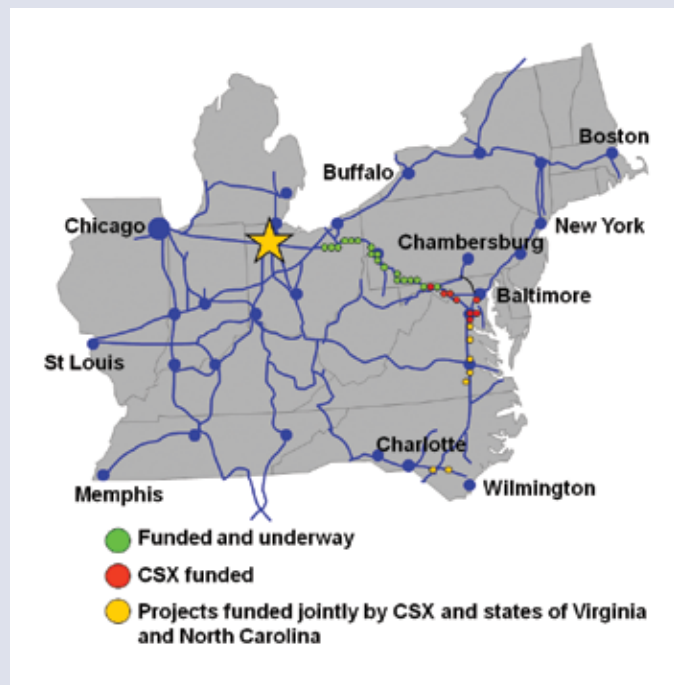
KEY PLAYERS

The rail system of Southwestern Pennsylvania consists of more than 1,300 miles of track operated by 17 railroad companies, including three large Class I railroads—Norfolk Southern Corp., CSX Corporation Inc., and Canadian National Railway Company. Class I railroads connect to a larger system spanning the eastern and southern United States as well as Canada. While these companies are privately owned, they also function as a rail network by working together to make connections that extend their geographic reach.

In Southwestern Pennsylvania, Norfolk Southern owns more than one-third of the track and runs 70–90 trains a day through the region. The Buffalo & Pittsburgh Railroad owns 194 miles and serves industrial locations, with lines reaching from New Castle into Allegheny and Indiana counties. CSX operates and maintains 2,000 miles of track throughout the state, and its whole network serves 70 ocean, lake, and river ports throughout the country.

The Wheeling & Lake Erie Railway (W&LE) maintains a line from Ohio through Washington County that heads north into suburban Pittsburgh and ends in Fayette County. W&LE moves about 8,000 carloads through the region, mostly coal and steel products. Other short-line railroads also serve industries in the region. Most of these regional and short-line railroads have a backlog of infrastructure projects necessary to bring their lines up to industry standards.

Passenger rail in the region consists of four daily Amtrak trains stopping in Pittsburgh: the Capitol Limited between Washington, D.C., and Chicago, Ill., and the Pennsylvanian to and from New York, N.Y.



Current CSX Rail Projects

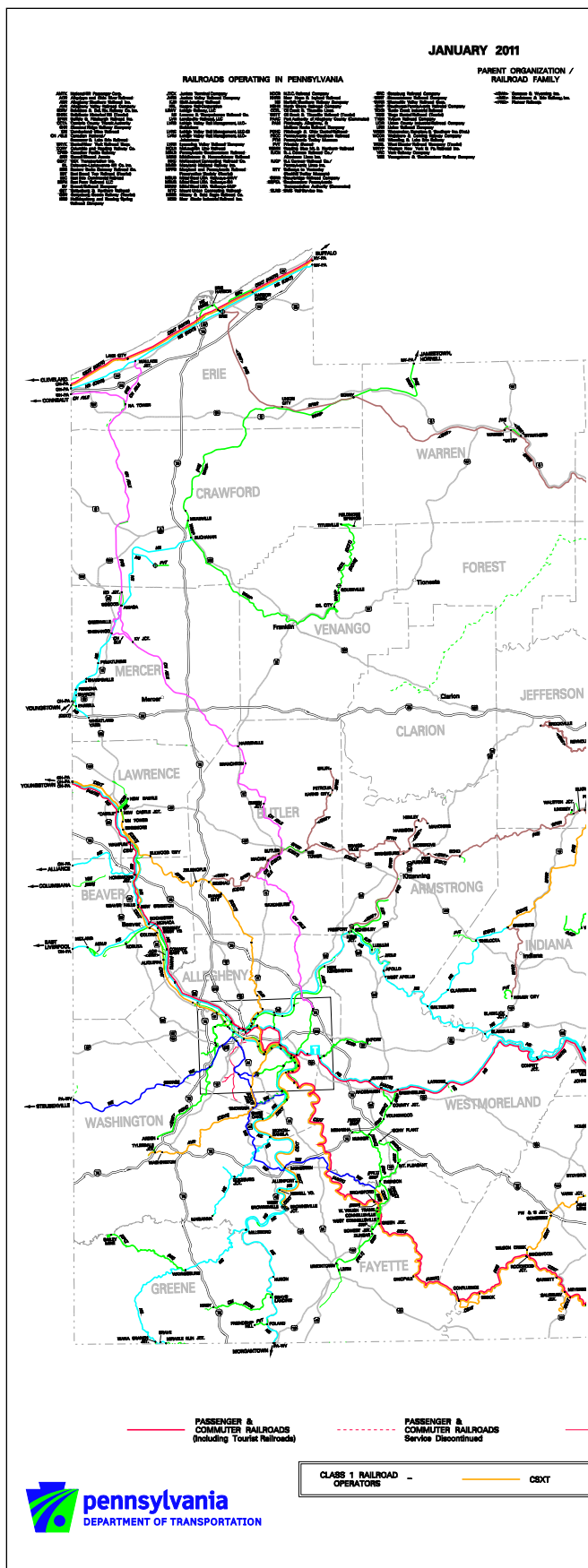
FUNDING

Many rail projects qualify for federal stimulus funding as being “shovel ready.” Agencies such as the Pennsylvania Department of Transportation (PennDOT) allocate this funding. However, railroad companies independently operate their own infrastructure. As a result, they have trouble sharing project status with PennDOT because they do not have a formal mechanism through which to share project readiness.

Pennsylvania is considered a national leader in rail support in the provision of funding under the Rail Freight Assistance and Rail Technical Assistance programs. These two programs provide \$20 million for rail infrastructure extension and rehabilitation. Funding is allocated on a competitive basis to railroads or railroad-served businesses. The state also awards funds through its capital budget.

PRIORITIES

Regional railroads are aggressively recruiting businesses to locate along their lines because of rail’s many benefits and potential to serve as a crucial supplier for emerging industries. At the same time, countless projects are in need of funding, including bridge replacement, track replacement and installation, and upgrades to communication and signal infrastructure. As demand rises for rail services, completing improvements and maintenance will be critical to ensuring safe and successful operation of the railway system.



CHALLENGES AND OPPORTUNITIES

Funding

The rail industry is responsible for virtually all costs of its infrastructure maintenance. In comparison, the trucking industry receives an infrastructure subsidy from the public provision of highways. Rail development is an expensive and inflexible undertaking. Once you lay track, you can't move it. As such, railroads need a reasonable expectation of ongoing business before committing to major expansion.

Environmental benefits

Rail is more environmentally friendly and energy efficient than road or highway transport. According to the U.S. Environmental Protection Agency (EPA), freight trains emit approximately three times less nitrogen oxide and particulates per ton-mile than highway transportation. A single train can carry the load of more than 280 trucks, taking them off of our nation's overcrowded highways. Rail can reduce annual greenhouse gas emissions by an estimated 12 million tons by shifting just 10 percent of long-haul freight from highways onto railways.

Right-of-way

Possibilities for commuter rail and expanded passenger rail service exist but require collaboration with existing railroads. Passenger rail travels on freight rights-of-way, causing inconvenience to both users. Passenger trains receive preference because they usually travel faster than freight trains. Freight shipments must pull off at sidings, but moving out of the way can be difficult and can delay passenger trips.

Intermodal transportation. Railways are experiencing increased business from the trucking industry. Customers move shipments on rail for long distances and then use trucks for delivery to final destinations.



THE NATIONAL GATEWAY PROJECT

CSX is spearheading the National Gateway project, an \$842 million multistate railway modernization program. The project aims to build a more efficient double-stack cleared rail corridor between mid-Atlantic seaports and Midwest distribution centers. Double-stack clearances allow trains to carry twice the amount of freight on the same number of trains, increasing efficiency and reducing environmental impact. As the population and economy continue to grow, the nation will continue to depend on the safe operation of rail and highway infrastructure.

Main goals:

- Remove freight bottlenecks between mid-Atlantic ports and the Midwest and increase transportation efficiency
- Strengthen infrastructure to keep up with domestic and international freight demand
- Increase efficiency of transportation for raw materials and consumer goods

The National Gateway project is expected to yield a number of benefits, including:

- an estimated \$35 in public benefits for every dollar of public money invested,
- improved transit times between coastal ports and metropolitan centers by 24–48 hours,
- reduced highway congestion and transportation emissions, and the creation of more than 50,000 jobs.

In addition, the project proposes a \$168 million investment in the state and the establishment of a new intermodal terminal in the Pittsburgh area.

Learn more about the National Gateway project:

www.nationalgateway.org



RESOURCES

Amtrak

www.amtrak.com

American Society of Civil Engineers 2010 Report Card for Pennsylvania's Infrastructure—Freight Rail

www.pareportcard.org

Canadian National Railway Company

www.cn.ca

CSX Corporation Inc

www.csx.com

National Gateway

www.nationalgateway.org

Norfolk Southern Corp.

www.nscorp.com

PennDOT Bureau of Rail Freight, Ports, and Waterways

www.dot.state.pa.us/Internet/Bureaus/pdBRF.nsf/RailFreightHomepage

Pennsylvania Public Utility Commission

www.puc.state.pa.us

U.S. Department of Transportation TIGER Grants Program

www.dot.gov/tiger

Wheeling & Lake Erie Railway

www.wlerwy.com





ROADS AND BRIDGES

With one of the highest numbers of developed waterway miles, Pennsylvania is home to more than 1,000 deficient bridges, with hundreds more on the edge. Southwestern Pennsylvania is home to a number of major highways and several thousand miles of roads. The region is virtually eliminating new capacity projects, diverting the funds into critical repairs and maintenance. It is a struggle for state and federal funding to meet the growing needs of aging road and bridge infrastructure. Faced with rising demand, less funding and investment will mean even more tough decisions ahead for both users of the roads and the agencies that maintain them.

KEY PLAYERS/CONTEXT

The Southwestern Pennsylvania Commission (SPC) is the official metropolitan planning organization serving the 10-county Southwestern Pennsylvania region. SPC directs the use of state and federal transportation and economic development funds in the region. The agency also serves as the local development district and economic development district responsible for establishing regional economic development priorities.

Pennsylvania Department of Transportation (PennDOT) Districts 10-0, 11-0, and 12-0 collectively manage 8,000 miles of roads and 5,300 bridges as well as 300 miles of highway. Of these, more than 1,700 miles of roadway are considered poor and nearly 1,400 bridges are rated structurally deficient.

Counties and municipalities bear responsibility for roadways outside the PennDOT system. Allegheny County, for example, maintains numerous major roadways and bridges that it constructed, including 800 miles of roadway and 520 bridges, nine of which are major river crossings. The City of Pittsburgh owns 186 additional bridges.

Deficient bridges are a pressing problem statewide but particularly in Southwestern Pennsylvania. Bridges in the region are on average eight to 10 years older than the state average. Statewide inspection efforts intensified following two major bridge incidents: the collapse of a 60-ton bridge beam onto Interstate 70 in Washington County (2005) and the Minneapolis bridge collapse in Minnesota (2007).

FUNDING

Federal and state funding for roads and bridges is increasingly unstable but is anticipated to continue at current levels. However, state infrastructure needs far outweigh the present level of funding. Historically, maintenance and new construction funding was distributed 80/20. Today, the allocation is closer to 95/5. Highway and bridge funding has flipped from 60/40 to 30/70 to focus on bridges.

At the federal level, legislation provides funding based on a formula, not actual revenue. Managed by the Federal Highway Administration, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users is the primary allocator of federal funds to state infrastructure programs. PennDOT has stressed the need for consistent, sustainable funding rather than transient stimulus packages and stopgap measures. Due to the ongoing federal deficit situation, highway and bridge infrastructure maintenance is likely to become more of a state responsibility than a national one.

At the state level, revenue has declined. The liquid fuels tax and Motor License Fund pay for routine maintenance items such as snowplowing, salting, repaving, line painting, pothole patching, and shoulder stabilization as well as for the staff to carry them out. Between 1986 and 2006, vehicle traffic increased by 60 percent and heavy truck traffic by 83 percent. Meanwhile, the prices of asphalt, diesel fuel, and road salt have increased.

At the regional level, highway and bridge projects are funded through the four-year Transportation Improvement Program (TIP). As required by federal legislation, SPC develops and updates TIP every two years. The program serves as the regional blueprint for spending federal and state funding allocations.



In August 2011, Governor Tom Corbett's Transportation Funding Advisory Commission released several recommendations on how to fund state transportation needs, including the following:

- Cap and move the cost of funding the Pennsylvania State Police into the General Fund
- Adjust vehicle and driver's license fees for inflation
- Uncap the Oil Company Franchise Tax
- Modernize and implement various cost-saving measures
- Dedicate 2 percent of sales tax receipts for transit
- Increase local transit funding

After the commission released its report, State Senator Jake Corman proposed legislation (SB 4, SB 1326, SB 1327) mirroring many of these recommendations. State Representative Dan Frankel also has introduced bills to secure funding for Pennsylvania's transportation system. Modeled after the governor's Transportation Funding Advisory Commission, these bills seek to develop a sustainable funding solution for statewide roads, bridges, and public transit systems.

PRIORITIES

In Southwestern Pennsylvania, PennDOT's top priority is the reduction in the number of structurally deficient bridges. General roadway maintenance includes bridge preservation, seal coating, and microsurfacing to extend asphalt pavement lifetimes. The asset management strategy now focuses on extending pavement life through preservation rather than on pavement smoothness. Microsurfacing can add three to seven years of life to existing pavement. The agency also uses recycled asphalt and is exploring other environmentally friendly practices for recycling pavement.

In addition, PennDOT's Smart Transportation initiative focuses on streamlined project delivery and system preservation by:

- using facilities through the full design life through improved maintenance techniques and providing the right treatment at the right time,
- promoting best fit transportation projects and looking for the most economical solutions to maintain and improve system capacity and operations, and
- linking planning and the National Environmental Policy Act (NEPA), and emphasizing linking land use and transportation.

CHALLENGES AND OPPORTUNITIES

Funding alternatives

As private investment in new construction becomes more common, new projects may seek alternative financing methods such as P3s, transportation development districts, development

impact fees, and congestion pricing. Policymakers can provide guidance to the decisions determining how much each party contributes to a project. Redesigning federal and state processes as well as introducing public/private partnership (P3) legislation can promote smarter use of private resources within publicly regulated processes.

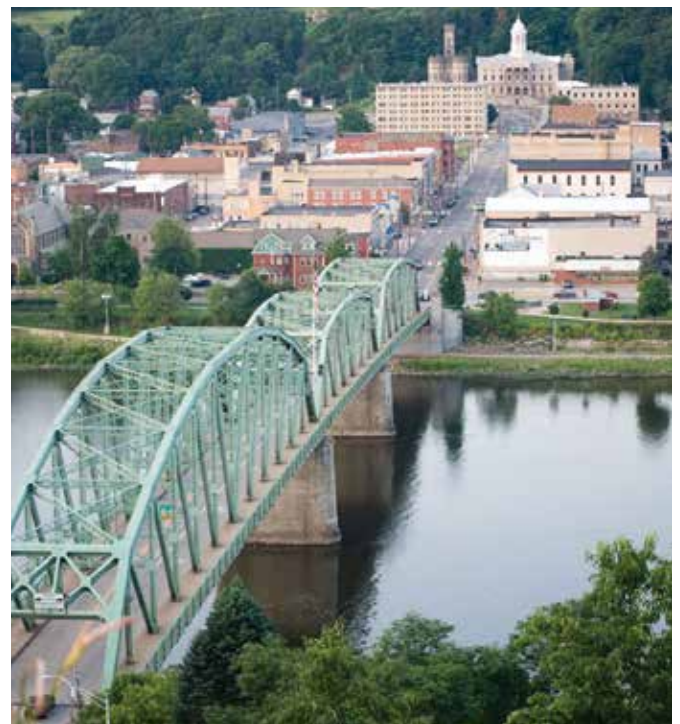
However, the marriage of private money and public processes can be challenging. Developers may want to contribute money up front and all at once, but public money is allocated years in advance. Because every public dollar is spoken for, public agencies cannot be the deep pocket for cost overruns. Local interest in economic development often leads to more public contributions than private. At the same time, communities may have to turn to private contributions if public funds dry up.

Workforce development

Despite the recession, PennDOT is having difficulty attracting candidates for some well-paying entry-level positions, such as engineering technicians and construction inspectors. These jobs typically require a high school diploma or two-year degree. At the same time, more applicants are applying to higher technical positions, such as civil engineers.

Vehicle miles traveled

Rising fuel efficiency and electric vehicles are reducing revenue from per-gallon gas taxes. Shifting from a per-gallon gas tax to a per-mile tax on auto use may be a more reliable revenue generator for the state.



Kittanning, Armstrong County, and the Allegheny River

Regional development. To maximize cost-effective infrastructure investments, SPC promotes more compact development patterns in corridors and existing communities. The commission's long-range development plan, the 2040 Plan, recommends several improvements, including the following:

- Traffic signal optimization will improve driving experience by reducing delays and congestion but is often hard to achieve. Municipalities own the traffic signals and may lack the incentive or resources to make improvements. Pennsylvania is one of only nine states that have no state ownership or maintenance of traffic signals. As many as 80 percent of the region's 2,600 signalized intersections could be improved with equipment upgrades or retiming. SPC's Regional Traffic Signal Program is working to advance more than \$3 million in traffic signal improvements with municipal partners in 16 corridors throughout the region.
- The state may be interested in transferring lightly traveled rural roads to county or municipal management.

Allegheny County has proposed adoption of an approach to road ownership based on functional classification, location, and traffic volumes. The county owns an unusually extensive and discontinuous collection of bridges and roadways. It would like to transfer ownership of its major bridges and up to 80 miles of major roads to PennDOT while acquiring other facilities as appropriate.

Distributing liquid fuels tax funds according to present county ownership of roads and bridges would better address today's needs. At present, allocation is still based on the amount of gas consumption in each county in the years 1928–30.

Public opinion. Users complain when bridges or roadways are closed completely and prefer at least one alternating lane of traffic. However, efficient rehabilitation often requires continuous hours of complete road closure. Scheduling maintenance work on weekends and at night may reduce public impact but increases costs for overtime labor and special lighting. Collaboration among infrastructure sectors can reduce costs and save time by coordinating repair schedules.

Administrative cost saving

Best practice methods include:

- combining design and build stages on project bids, merging multiple similar bridge projects in a single bid, reducing duplicative inspection oversight, and
- applying more seal coating instead of paving.

Some PennDOT district staff would prefer greater flexibility to use newly developed construction materials. The extensive approval process can hold agencies back from using new technologies for years. State legislation can facilitate alternatives such as the use of design-build and design-build-operate-maintain project contracting.



RESOURCES

American Society of Civil Engineers (ASCE) 2010 Report Card for Pennsylvania's Infrastructure—Roads and Bridges

www.pareportcard.org

ASCE Failure to Act: The Economic Impact of Current Investment Trends in Surface Transportation and Infrastructure

www.asce.org/Infrastructure/Report-Card/Surface-Transportation

Federal Highway Administration

www.fhwa.dot.gov/

Transportation Funding Advisory Commission

www.tfac.pa.gov

Pennsylvania Department of Transportation

www.dot.state.pa.us

Pennsylvania Turnpike Commission

www.paturnpike.com

Southwestern Pennsylvania Commission

www.spcregion.org

U.S. Department of Transportation

www.dot.gov



TELECOMMUNICATIONS

One of the most competitive infrastructure sectors in Southwestern Pennsylvania, telecommunications has been the target of recent groundbreaking state and federal legislation. Customer demand for telecommunication products and services has fallen. However, infrastructure development is still expected to expand.

CONTEXT

Telecommunications service is covered by several types of providers:

- Incumbent local exchange carriers (ILECs), including Frontier Communications Corporation, Windstream Communications, and North Pittsburgh Systems Inc. (now part of Consolidated Communications),
- Competitive local exchange carriers (CLECs), which are mainly resellers of ILEC services, but may also have their own networks for providing services in the region, and
- Wireless service providers and intermodal carriers, which include Comcast, Verizon, and Vonage as well as voice over internet protocol (VoIP) service.

Wired and wireless infrastructure areas do not always overlap, and larger providers may operate more than one service company. For instance, Verizon Pennsylvania, Verizon North, and Verizon Wireless are Verizon affiliates operating their own network infrastructures.

The Pennsylvania Public Utility Commission, Pennsylvania Telephone Association, and Broadband Cable Association of Pennsylvania all supervise phone and Internet carriers. Telecommunications utilities are unique in that they must provide a spectrum of services over different modes of infrastructure, including the following:

- residential telephone service
- fiber-to-the-premises voice
- data and video products
- digital subscriber line (DSL)
- wireless Internet
- high-speed, high-capacity data services for businesses

Verizon Pennsylvania and Verizon North provide a wide array of services to hundreds of thousands of customers in the region. Most customers of Verizon are served by a traditional copper network that provides both voice and high-speed Internet service. In recent years, Verizon deployed an advanced fiber optic network to support a suite of services known as FiOS, which includes voice, video, and ultrahigh-speed Internet services. The fiber optic network is typically installed as an

overlay on the existing copper network but sometimes may be the sole area network.

FUNDING

Telecommunications utilities use operating revenues to fund their network infrastructure. Companies such as Verizon also may issue publicly traded securities for additional revenue. Planning, budgeting, and tracking expenditures for expanding high-speed Internet service and the FiOS network are not done on a regional basis. At the statewide level, Verizon estimates the cost of activities for the next budget year based on the costs of similar work and the needs of the state.

PRIORITIES

Verizon cites two events in the past 20 years as the most significant in increasing infrastructure deployment throughout Verizon's Pennsylvania service territory. One is the rollout of FiOS. The other is state legislation originally enacted in 1994 and renewed by Act 183 of 2004. As a result, Verizon is obligated to make 1.544 Mbps or higher broadband service available to 100 percent of its retail access lines by December 31, 2015. Regional expansion and development is ongoing in order to meet the goal of providing broadband network access to all Pennsylvanians by 2015.



Act 183 also directed the state Department of Community and Economic Development (DCED) to maintain a statewide inventory of broadband deployment. The agency constantly updates and improves its electronic maps with information provided by ILECs, cable companies, and other broadband providers. These maps are available for use by economic development agencies, chambers of commerce, and other interested parties.

In addition, Act 183 created programs to enable effective public/private partnership (P3) approaches for broadband deployment:

- **Broadband Outreach and Aggregation Fund:** This ILEC-funded program educates consumers about current broadband availability and the statewide broadband build-out.
- **Bona Fide Retail Request program:** Under this program, residents can aggregate local broadband demand in order to attract these services to their communities sooner than they might otherwise receive them via Verizon's broadband deployment program.
- **Business Attraction and Retention Program (BARP):** Through BARP, start-up businesses and businesses looking to relocate in Pennsylvania may utilize DCED's mapping resources to determine where broadband infrastructure exists and obtain advanced services from ILECs.

All three programs focus on identifying and stimulating demand for broadband services. Using these programs and tools, businesses and consumers can help to encourage investment in network infrastructure and identify areas where broadband service is unavailable.

Verizon is finishing the two-decade build-out of its broadband network in the more rural areas of Verizon's Southwestern Pennsylvania service territory. The company is expanding its



copper broadband network and continuing its development of FiOS. This network is expected to have a very long life cycle because it is less vulnerable to weather and other environmental factors that increase deterioration over time.



CHALLENGES AND OPPORTUNITIES

Regulation

Statutory changes reducing or eliminating state regulation of incumbent telephone companies would promote competition and infrastructure investment. Large service providers are hampered by archaic regulations that do not extend to other types of providers such as cable and wireless companies in the market.

Infrastructure goals

Telecommunications success in the region will be measured upon reaching two goals:

- Deploying the fiber network to all customers slated to receive it by the end of 2010
- Making broadband service available to all customers by the end of 2015

Incentives

Tax incentives or exemptions for broadband providers would reduce the overall cost of investment and deployment. In order to support investment, substantial incentives are needed to encourage deployment in unserved or underserved areas. For instance, Montana authorized a 20 percent telephone company license tax credit for accelerated deployment of advanced telecommunications infrastructure improvements.

Public/private partnerships

P3s could fund more BFRF broadband deployments in rural regions and are well suited for building nonnetwork facilities such as wireless towers. These are less effective if the partnerships seek to own the new facilities. Most service providers want to maintain end-to-end ownership of networks to ensure system integrity and security.



RESOURCES

Broadband Cable Association of Pennsylvania

www.pcta.com

Federal Communications Commission

www.fcc.gov

Pennsylvania Telephone Association

www.patel.org

Pennsylvania Broadband Initiatives

www.newpa.com/strengthen-your-community/broadband-initiatives

Pennsylvania Public Utility Commission

www.puc.state.pa.us

Verizon Pennsylvania

www22.verizon.com/about/community/pa



WATER AND SEWAGE

Southwestern Pennsylvania is home to the nation's largest concentration of combined sewer systems, parts of which are more than 100 years old. More than 800 public authorities, municipalities, and private companies make up this fragmented system. The region suffers from numerous water and sewer issues, including severe flooding exacerbated by suburban development, aging infrastructure, widespread abandoned mine drainage, overloaded sewage systems, soils that are unfriendly to on-lot septic systems, and bacterial contamination of rivers and streams. The system has fallen significantly out of compliance with federal laws but lacks the necessary funding to address these concerns. Upgrading it requires billions of dollars in investments, many of which are legally mandated under environmental regulations and consent orders. With tightening budgets, local authorities have been forced to prioritize existing projects and defer much-needed maintenance. Together, these factors have produced one of the most complex infrastructure challenges facing the region today.

KEY PLAYERS

The Pennsylvania Infrastructure Investment Authority (PENNVEST) is a state revolving loan and grant program. PENNVEST provides low-cost financial assistance to fund drinking water, wastewater, storm water, and nonpoint source (acid mine drainage, brownfield, green infrastructure, nutrient trading, and on-lot systems) projects.

The Allegheny County Sanitary Authority (ALCOSAN) provides wastewater treatment to 83 communities, serving nearly 900,000 million people in Allegheny County and its neighbors. The authority operates one of the largest wastewater treatment facilities in the Ohio River Valley. In this region, collection and treatment functions are owned separately. As a result, downstream authorities such as ALCOSAN are responsible for treating wastewater coming from tributary collection systems upstream.

In 1997, the U.S. Environmental Protection Agency (EPA) cited more than 50 communities in the ALCOSAN service area for sewage overflows violating the federal Clean Water Act. The main problem is that too much storm water is entering the region's combined sewers when it rains. As little as 0.1 inch of rain can overload the system and cause untreated sewage to overflow into local rivers and creeks. This is problematic because many Allegheny County residents depend on these rivers for drinking water and recreation. After years of negotiations, ALCOSAN signed a consent decree in 2007, requiring an estimated \$4–5 billion in investments to bring the system into compliance with EPA water quality standards and the Clean Water Act.

In response, ALCOSAN created the 3 Rivers Wet Weather (3RWW) demonstration program. The organization has played a major role in identifying, studying, and addressing sewer-related issues. Its mission is to improve the quality of the county's water resources by helping communities to address the issue of untreated sewage and storm water overflows.

The Municipal Authority of Westmoreland County (MAWC) is the largest municipal authority in the state. MAWC serves about 125,000 customers in Westmoreland County as well as parts of Allegheny, Armstrong, Indiana, and Fayette counties.

Pennsylvania American Water is the largest investor-owned water utility in the state and a subsidiary of American Water. In its western service area, Pennsylvania American Water provides water and wastewater services to Allegheny, Butler, Clarion, Lawrence, McKean, Warren, and Washington counties.

U.S. Department of Agriculture (USDA) Rural Development operates offices in Westmoreland and Butler counties. The agency works to improve the economy and quality of life for rural Americans by promoting economic development and supporting public services such as water and sewage projects. Demand for these projects is expected to rise as industrial pollution continues to impact rural water sources.

FUNDING

The federal budget does not directly fund local water and sewage projects but may fund agencies, such as EPA, that offer assistance. In 2008, Pennsylvania state legislators and voters approved an \$800 million bond issue to make investments in water, sewer, dam, and flood control infrastructure. Known as the H2O PA program, these bonds are funded by gambling revenues and administered by the Commonwealth Financing Authority. The H2O program is now closed. Voters later approved an additional \$400 million bond issue to be administered by PENNVEST.

Public drinking water and sewage authorities generally cover costs through user fees, while homeowners are responsible for private wells and septic systems. As a nonprofit agency, ALCOSAN also can raise capital funds by selling sewer revenue bonds. 3RWW receives its primary program funding from federal EPA grants, ALCOSAN, and the Allegheny County Health Department.

Pennsylvania American Water has no ongoing funding gaps in its operations and pays for system repairs and upgrades in different ways. Capital investment is funded 50 percent through equity and 50 percent through long-term debt. The debt obligations are funded by PENNVEST as well as other sources. With the Public Utility Commission's approval, Pennsylvania American

Water has built a distribution system improvement charge (DSIC) into its tariff. Instead of filing frequent base rate increases to pay for improvements, the company uses DSIC to fund replacement of aging pipelines and adjusts the amount quarterly. Several other water companies have adopted similar policies.

USDA has experienced budget cuts nationwide, threatening funding for development programs in rural America. Local offices already have projects stuck in development limbo and maintain waiting lists more than 10 years long.

PRIORITIES

In 2008, the Governor Edward G. Rendell created the Sustainable Water Infrastructure Task Force, which produced a list of recommendations to improve water infrastructure, including the following:

- better asset management
- full-cost pricing
- water efficiency programs
- watershed management principles
- regionalization

Utilities and other entities in the sector have used these recommendations as a baseline for moving forward on projects to improve systemwide efficiencies.

In addition to its existing programs, PENNVEST initiated a nonpoint source remediation funding program to encourage nonstructural best management practices for water quality improvement. This new program responded in part to the nonstructural alternatives emphasized by the Sustainable Water Infrastructure Task Force. In April 2012, PENNVEST announced the investment of \$115 million in 28 nonpoint source, drinking water, and wastewater projects across the state. Southwestern Pennsylvania will receive nearly \$20 million in loan and grant funds for projects in six counties. Funding comes from a combination of state funds, federal grants from EPA and recycled loan repayments from previous funding awards.

ALCOSAN is under federal court order to eliminate sanitary sewer overflows and to significantly reduce combined sewer overflows. The authority organized its 83 municipalities into seven planning basins in order to develop a regional long-term wet weather control plan. Once completed, the plan will represent a comprehensive regional solution to municipal combined sewer overflows and sanitary sewer overflows. ALCOSAN, EPA, and the U.S. Department of Justice have agreed on the following timeline for implementing the plan:

- ALCOSAN must submit the finalized wet weather plan to regulatory agencies in 2013.

- Construction is set to begin in 2015.
- All facilities, operations, and maintenance should be in place by 2026.

3RWW is assisting municipalities with this process. The organization acknowledges the difficulties of implementing systemwide regulations and technology upgrades across the 83 separate municipal authorities within ALCOSAN. To prepare these communities, 3RWW is exploring regionalization, cost sharing, integration, and consolidation studies. In addition, the organization offers access to a variety of tools and technologies, including a secure municipal data support site. Municipalities use this tool to organize and share information such as regional mapping and flow monitoring data. Within the next 10 years, the cost of the regional plan will be on municipal agendas. 3RWW is preparing these communities to work together on implementation.

In addition, 3RWW is exploring green infrastructure and new technology initiatives. Green alternatives include biofiltration systems, porous pavement, green roofs, rain gardens, and water source reduction. These projects reflect a growing emphasis on “green” source water projects as opposed to “gray” sewage projects. The organization is exploring new technology, including underground robotics inspection and advanced information systems.

MAWC is constructing a water transmission and storage system in partnership with the Greater Johnstown Water Authority (GJWA). Upon its completion, MAWC will purchase potable water produced by GJWA to supply MAWC customers in the Ligonier Valley. Additionally, the GJWA/MAWC interconnection will facilitate the extension of municipal water service to neighboring municipalities. Likewise, the project will present opportunities to provide emergency interconnection with other municipal water systems.

Pennsylvania American Water develops five-year capital investment plans for plant utility facilities. The capital component includes pipeline replacement and water treatment upgrades such as treatment facilities, pumping stations, and storage tanks. In the past decade, the company has replaced water mains at an average rate of 80 miles per year.

USDA Rural Development and rural municipalities identified water and wastewater systems as their top infrastructure priority. Many rural homes rely on well water and septic systems. In six of the 11 Southwestern Pennsylvania counties, less than half of all households have public sewage. As rural households are often spread out across large distances, public services are more expensive and difficult to implement. As a result, while local officials want to connect rural households in need with public water and sewers, they often find it highly cost prohibitive to do so.



would allow it to bundle these functions together in order to receive lower pricing.

Enacted in the late 1990s, DSIC legislation enables water utilities to assess a surcharge on pipe, hydrant, and meter replacements each quarter. The charge supplements earnings for the utilities while smoothing out rate increases for customers. According to PUC, Pennsylvania's DSIC system for water utilities has been held up as a national model, and a number of other states have adopted similar systems.

Since 2008, legislation has been proposed to expand this kind of charge to wastewater systems. A collection system improvement charge (CSIC) has Public Utility Commission support. The charge would provide wastewater utilities with the financial flexibility to accelerate infrastructure improvements, including projects to address overflows, infiltration, inflow, and similar problems.

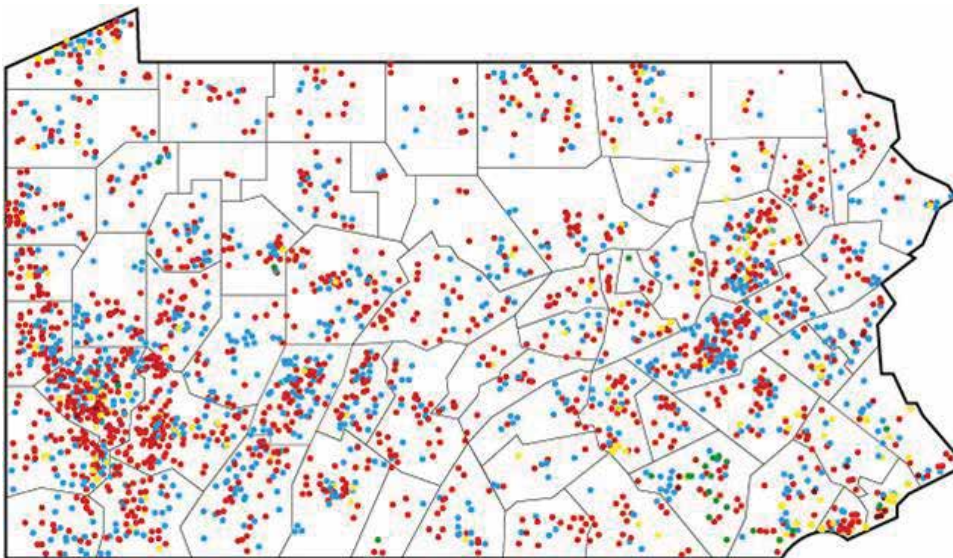
CHALLENGES AND OPPORTUNITIES

Federal and state legislation

The proposed federal Sustainable Water Infrastructure Investment Act of 2011 would remove the volume cap limitations on using private activity bonds for low-cost investments in water and sewage infrastructure. Currently, a municipality or authority must separately bid each function (design, construction, operation, and finance) of a project. One provision of this bill

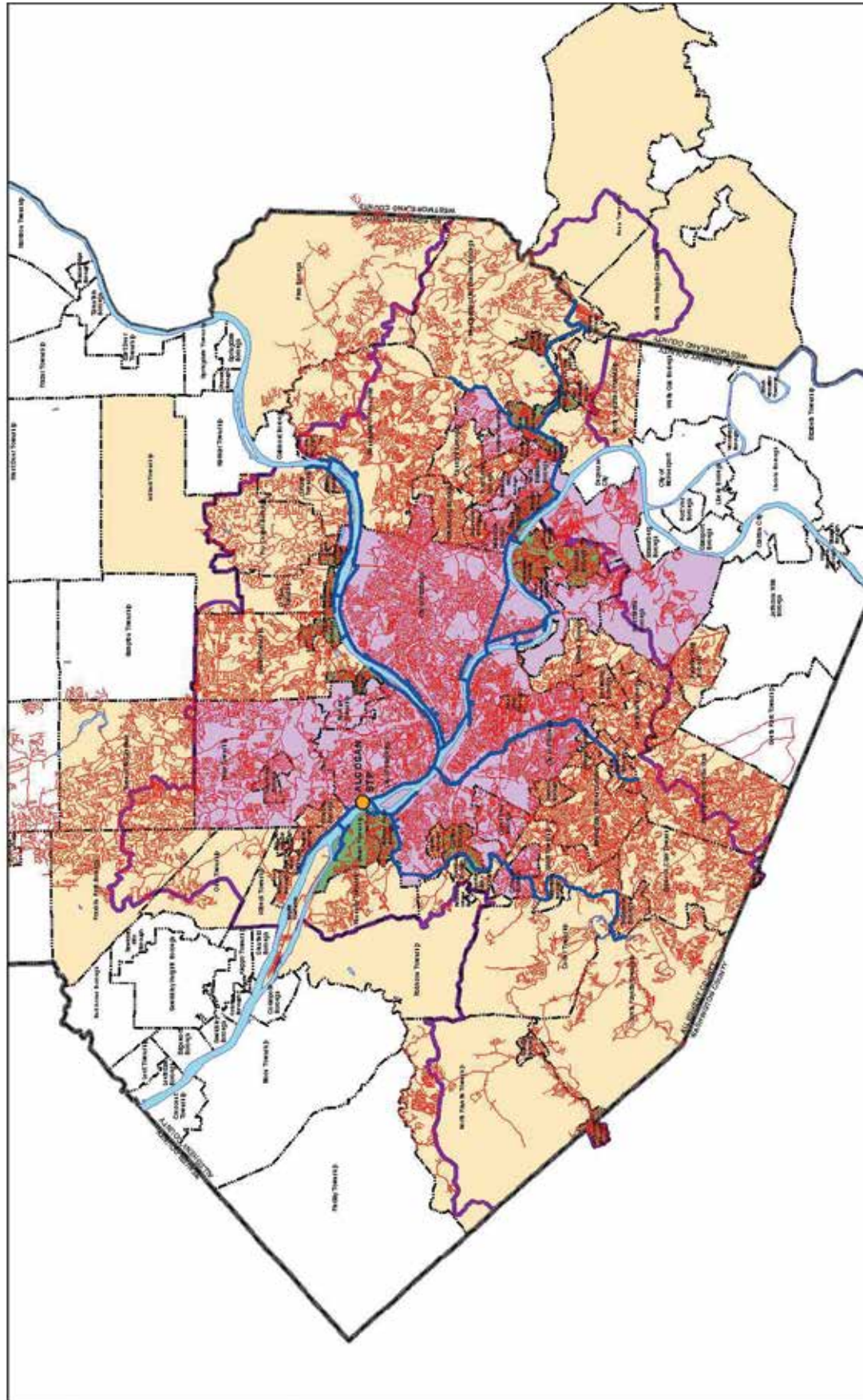
Targeted grant funding

Grant programs often give funding priority to systems under consent orders for noncompliance. Some of these projects could be locally funded through usage rates or low-interest PENNVEST loans. Small systems have smaller rate bases and are unable to fund significant projects on their own, without causing rate shock. Prioritizing grant eligibility is one way to ensure that all systems can adequately address their infrastructure needs.



- Water Projects
- Wastewater Projects
- Nonpoint source Projects
- Stormwater Projects
- Brownfield Projects

ALCOSAN Service Area Combined and Separate Sanitary Communities



Rightsizing

Technical and regulatory requirements are challenging for smaller authorities with limited resources. Some authorities have found relief through consolidation or collaboration with larger entities such as MAWC or the Indiana County Municipal Services Authority. Offering incentives to practice this type of consolidation may enhance management efficiency and quality.

Workforce development

The entire water and wastewater industry is facing a shortage of skilled workers due to an aging workforce and retirement. In a survey conducted by the Institute's Regional Water Management Task Force several years ago, more than two-thirds of responding local authorities and municipalities indicated an average employee age of 45 or older. A 2010 study by the Water Research Foundation found that between 30 and 50 percent of industry workers plan to leave their jobs in the next 10 years. The industry needs programs to predict and mitigate significant turnover and critical knowledge loss.

Public/private partnerships

P3s can provide valuable resources to financially distressed municipalities. For example, larger companies often have greater access to capital markets, both debt and equity. Companies also can take advantage of low-cost financing available through commonwealth entities such as PENNVEST and the Pennsylvania Economic Development Financing Authority. While approximately 85 percent of water systems are municipally owned, the private sector plays a leadership role in the water industry and has a record of bringing much-needed capital, efficiencies, and innovations to municipal partnerships.

Improving state tax structure

Currently, 4.35 percent of each customer's bill relates solely to capital stock tax, corporate net income tax, and the public utility realty tax. By streamlining its corporate tax structure, the state can make its business environment more favorable to job creation and can help to control water costs.

Technology and modernization

Successful demonstrations of new technologies can later support water and wastewater facilities across the commonwealth. Pennsylvania American Water uses solar energy to power one of its treatment plants. The company also is implementing an alternative energy demonstration project designed to recover and reuse hydrokinetic energy to power the Oneida Valley Water Treatment Plant in Butler County.

Private well regulation

Pennsylvania does not regulate private well construction. Regulations will become increasingly important as the Marcellus Shale gas industry continues to grow. When private drinking water is

contaminated, it is difficult to tell whether the well construction company or nearby gas drilling is responsible for damages.

RESOURCES

3 Rivers Wet Weather

www.3riverswetweather.org

Allegheny County Health Department

www.achd.net

Allegheny County Sanitary Authority

www.alcosan.org

American Society of Civil Engineers (ASCE) 2010 Report Card for Pennsylvania's Infrastructure— Drinking Water, Stormwater, and Wastewater

www.pareportcard.org

ASCE Failure to Act: The Economic Impact of Current Investment Trends in Water and Wastewater Treatment Infrastructure

www.asce.org/Infrastructure/Failure-to-Act/Water-and-Wastewater

American Water Works Association

www.awwa.org

Commonwealth Financing Authority

[www.newpa.com/find-incentives-apply-for-funding/
commonwealth-financing-authority](http://www.newpa.com/find-incentives-apply-for-funding/commonwealth-financing-authority)

Municipal Authority of Westmoreland County

www.mawc.org

Pennsylvania American Water

www.amwater.com/paaw

Pennsylvania Infrastructure and Investment Authority

www.pennvest.state.pa.us

Pennsylvania Public Utility Commission

www.puc.state.pa.us

Regional Water Management Task Force

www.iop.pitt.edu/water

Sustainable Water Infrastructure Task Force

[www.portal.state.pa.us/portal/server.pt/community/
sustainable_water_infrastructure_task_force](http://www.portal.state.pa.us/portal/server.pt/community/sustainable_water_infrastructure_task_force)

U.S. Department of Agriculture Rural Development

www.rurdev.usda.gov

U.S. Environmental Protection Agency

www.epa.gov



A Marcellus Shale facility

THE IMPACTS OF THE MARCELLUS SHALE ON INFRASTRUCTURE

The exploration and development of the Marcellus Shale has had a far-reaching impact across most if not all infrastructure sectors. The influx of industry into the region may provide a much-needed economic boost to utilities and businesses that are ready for the challenge but also may provide a slew of complications to already strained infrastructure.

PERMITTING

Pennsylvania's Department of Environmental Protection (DEP) is responsible for regulating well permits, wastewater, and earth disturbance activity. It also is responsible for safely regulating Marcellus Shale natural gas reservoirs. Since 1859, at least 350,000 commercial wells have been drilled in Pennsylvania. According to DEP's Bureau of Oil and Gas, nearly 500 unconventional well permits were issued in Southwestern Pennsylvania during the first half of 2012 (January 1–June 30). Each well that's drilled affects a part of Pennsylvania's infrastructure, so it is very important to examine how these sectors are handling these impacts and what needs to be in place to continue Marcellus Shale drilling safely and with fewer negative outcomes.

WATER AND SEWAGE

Water is one of the most prominent sectors affected by drilling in the region. Drilling and fracturing a single well typically requires approximately 4 million gallons of water, and companies project operating hundreds of wells in a single year. The chemicals used in "fracking" fluid, acid and gas that are encountered in well bores, diesel fuel, carbon dioxide, benzenes, ethylbenzene, toluene, xylene, surfactants (soaps), polymers (plastics), foaming agents, antiscaling agents, corrosion inhibitors, and toxic biocides may detrimentally affect natural underground sources of drinking water should they come into contact with them.

A general belief exists that appropriate protections are needed so that gas drilling companies and associated industries act responsibly. In the case of water, drilling companies need to adhere to all federal EPA and DEP regulations. DEP is responsible for the well permitting process and regulates wastewater discharges. The U.S. Army Corps of Engineers monitors regional waterways, and any potential source of wastewater discharge is a concern. In the fall of 2008 and in 2009, the Army Corps of Engineers' water quality monitoring stations

on the Monongahela River detected unusually elevated total dissolved solids levels during low flow conditions, potentially due to drilling activities in the area. These elevated levels led to concern among public water utilities that withdraw from the Monongahela River for fear of not meeting drinking water standards.

The corps also is responsible for 11 upper Ohio River reservoirs in Western Pennsylvania and manages water quality and quantity improvement projects through very sensitive storage and release schedules. If additional water is released into streams and tributaries without careful study, reservoirs may be impacted. The Port of Pittsburgh Commission also has raised concerns about how the demand for water from the drilling industry might affect navigation during the dry season. While the Marcellus Shale provides opportunities to move significant volumes of sand and water on the waterways, the current waterway infrastructure is suffering from a lack of maintenance and requires major rehabilitation.

Another area of concern is the transparency of the permitting process for water withdrawals. Companies like Pennsylvania American Water rely on regulatory agencies like DEP, the Delaware River Basin Commission, and the Susquehanna River Basin Commission to review permit requests from gas drillers. They also rely on these regulatory agencies to allocate both surface and groundwater sources to all users within the basin. In these instances, Pennsylvania American Water does not have any access to information about the permits during the review. These companies would like to see legislation changed so that there is greater transparency for information sharing with regard to permits.

When Marcellus Shale activities first developed in Southwestern Pennsylvania, a few existing sewage treatment plants took on the fracturing fluid for treatment. Many saw this as an easy source of extra revenue for just a little extra expense in chemicals. Treatment plants soon found that they could not meet effluent limits, and had to report water quality to DEP. The frack water was later found to contain too many metals for a standard sewage treatment plant to remove. Many rural sewage plants could benefit from the additional revenue stream of treating frack water, but most lack the capability to treat the water without some sort of pretreatment.

ROADWAYS

Roads and transportation conditions have been impacted by drilling, often because there is a disproportionate impact on locally owned roadways due to well locations and the structural design of the roadways. There has been an increase in drilling companies applying for heavy hauling permits through

PennDOT. So far, Districts 3-0 and 12-0 have been the most affected. PennDOT has observed increases in driveway permits (to access new sites), gas line permits (required if pipelines cross state roads), and the ability to haul on posted roads (secondary roads with a 10 ton limit). There also has been an increase in staff to check “Marcellus roads” weekly. Non-Marcellus roads are checked irregularly or when a situation calls for it. Anyone who is applying for a permit on a Marcellus road is required to submit a road user plan, which outlines road usage, the type of traffic that will be utilizing the road, a maintenance strategy, and the number of trucks that will use the road. This plan is a preemptive measure to identify whether the roads can meet the permittee’s needs. Additionally, the permittees are required to submit a winter maintenance plan if they are working through the winter. Companies are not permitted to haul on these roads without the aforementioned plan.

A policy modification has been made in response to Marcellus Shale activities in regard to damaged roads. After damage is noticed on a Marcellus road by inspectors, letters are sent out to permittees. The permittees then have five days upon receipt of the notification to repair the road or their permits may be revoked. The repairs made by companies that damaged roads have saved PennDOT from some basic maintenance and repair expenditures.

Counties and municipalities that own and maintain roads are currently permitted under state law to require owners of overweight vehicles to post bonds to cover the cost of damage they cause. The current bond limit is set at \$12,500 per mile of paved road. Legislation has been introduced to increase the PennDOT bonding requirements (which have not been adjusted since 1978) to cover today’s construction costs in order to better protect public roads.

ELECTRICITY AND NATURAL GAS

Other industries with obvious connections to Marcellus Shale activities are electricity and natural gas. Increased gas production should create a higher regional demand for pipeline capacity to bring the gas to market. As the market for production grows, there will most likely be upgrades in and expansion of transmission infrastructure.

Shale gas is allowing for growth in gas-fueled electricity generation, but currently there are major delays in stream-crossing permits for gas pipelines. Eliminating general permit air source exemptions will subject thousands of compressors and drill rig engines to new permitting and control requirements. There are concerns from those in the industry that these regulations will slow development and add to operating costs. Aggregations of air emissions sources will subject isolated and rural gas-related

facilities to EPA New Source Review and Prevention of Significant Deterioration rules.

On the demand side, electricity utilities may see an influx of demand from gas companies operating in the Marcellus, which has some local electricity companies scrambling to ensure that they are prepared to meet the need. Electricity utilities may see an influx of demand from gas companies operating in the Marcellus. The current electrical grid does not have the capacity to completely fulfill their energy needs, particularly to run the compressor stations. Some areas in which the gas companies operate do not even have electrical service.

RAILWAYS

As a result of traffic/volume increases, railway costs have gone up in many areas, especially in Bradford and Susquehanna counties. There also have been material cost increases. Part of the issue is that these sites, which have not been used in years, are experiencing much higher traffic volumes as a result of Marcellus Shale activity.

AIR TRANSPORTATION

Airports have seen modest increases in enplanements due to gas company employees’ traveling to Pennsylvania from out of state. The Westmoreland County Airport Authority (WCAA) is currently securing environmental clearances to drill wells at Rostraver Airport, which may have a substantial impact on WCAA’s budget in the future. The Federal Aviation Administration is overseeing this clearance process and has required WCAA to provide it with complete information regarding the possibility of drilling on airport property. The Allegheny County Airport Authority is investigating drilling options for more than 3,000 acres of undeveloped land around Pittsburgh International Airport. It is expected that the drilling will have a positive impact on the airport authority.

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U.S. POSTAGE
PAID
PITTSBURGH, PA
PERMIT NO. 511

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using renewable biogas energy and is certified EcoLogo,
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in cooperation with the Department of University Marketing Communications. UMC84208-0912